BIOLOGICAL ASSESSMENT

for the

California Integrated Weed Management Project

Humboldt-Toiyabe
National Forest
Carson and Bridgeport Ranger Districts

Humboldt-Toiyabe National Forest
Nevada, Sierra, Plumas, Lassen, Placer, El Dorado, Alpine, Tuolumne and Mono Counties, California

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I. INTRODUCTION

This Biological Assessment (BA) was prepared in accordance with Forest Service Manual (FSM) direction 2672.42, and meets legal requirements under Section 7 of the Endangered Species Act of 1973, as amended, and implements regulations [19 U.S.C. 1536 (c), 50 CFR 402.12 (f) and 402.14 (c)]. The BA provides a process through which federally listed species under the Endangered Species Act receive full consideration in the decision making process.

The purpose of this project is to implement an Integrated Weed Management approach to prevent, eradicate and/ or control infestations of invasive plants on the Humboldt-Toiyabe National Forest that occur in California, using manual, mechanical, biological, and chemical control measures. Treatments would involve integrated prescriptions that generally combine the use of multiple types of methods over several years. The purpose is also to establish criteria, under which an Early Detection Rapid Response (EDRR) approach would be implemented, thereby allowing for rapid treatment of newly discovered target invasive plants. Non-native invasive species have prolific seeding rates that quickly colonize in disturbed settings. Wildfire events, in particular, can pose the highest risk for weed spread with bare ground, high nutrient availability and a lack of competing plants. Displacement of native plant communities by invasive plants can have negative impacts on fire regimes, wildlife habitats, recreation opportunities, forage production, and scenic beauty. The California Integrated Weed Management Project (CIWMP) will include a monitoring plan that outlines a strategy for monitoring both treatment effectiveness and the effectiveness of project design features.

The California Integrated Weed Management Project is ongoing, covers an expansive area on the Carson and Bridgeport Ranger Districts, and includes using consistent treatment methods annually to control and eradicate noxious weeds. Although locations of some weed populations are currently known, locations of where and when future infestations will occur are not known. However, because treatment activities stay consistent year to year, potential environmental effects will be similar independent of the year treatment occurs or the treatment location. Numerous design features are incorporated into the Proposed Action to address potential effects in all known locations of Threatened and Endangered Species, as well as address anticipated effects in future occupied areas of Critical and or Suitable Habitat. This assessment addresses weed treatment activities for a ten-year period beginning in fiscal year 2017. Following this period, the Forest Service will reinitiate consultation with U.S. Fish and Wildlife Service (FWS).

II. BACKGROUND

The Humboldt-Toiyabe National Forest (HTNF) spans the entire state of Nevada and portions of California. In 2001 a programmatic Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) was completed to implement an Integrated Pest Management Program for the Toiyabe-Nevada portion of the Humboldt-Toiyabe National Forest. While this document provides a thorough strategy for controlling weeds on National Forest System (NFS) Lands in Nevada, NFS lands in California were not included in the analysis. There is a need to take an aggressive approach in controlling and eradicating invasive species that occur on HTNF Lands within California. Invasive plants are spreading at an alarming rate in California, and fast encroaching onto National Forest System lands. Currently in California there are approximately 200 invasive plant species identified by the California Invasive Plant Council (Cal-IPC), about 127 of which Cal-IPC identifies as occurring in the Sierra Nevada region. Approximately 1,166

acres of non-native invasive plant species are currently mapped within California on HTNF lands (Table 2). The majority of the known infested areas on the Carson and Bridgeport Ranger Districts occur primarily as scattered, individual populations that are between one and five acres in size. This is also true for infestations in occupied and critical habitat for threatened, endangered, and proposed species that occur in the project area (Table 3). Taking an aggressive approach in weed treatment will increase the potential for eradicating these small infestations and reduce the potential for future spread and continued loss of habitat.

The terms "Invasive Species" and "Noxious Weeds" are used interchangeably throughout this document to describe terrestrial, non-native plant species that pose a threat to native plant communities. More specifically:

Invasive plants are defined in Executive Order 13112 as "non-native plants whose introduction does or is likely to cause economic or environmental harm or harm to human health." Invasive plants compromise the ability to manage public lands for a healthy native ecosystem. Invasive plants can create a host of environmental effects that can be harmful to native ecosystem processes, including: displacement of native plants; reduction in functionality of habitat and forage for wildlife and livestock; increased potential for soil erosion and reduced water quality; alteration of physical and biological properties of soil; loss of long- term riparian area function; loss of habitat for culturally important plants; high economic cost of controlling noxious and invasive weeds; and increased cost of keeping recreational sites free of noxious and invasive weed species.

"Noxious" is a legal term, used by regulatory agencies, such as the California Department of Food and Agriculture (CDFA) and the U. S. Department of Agriculture Animal Plant Health Inspection Service (USDA-APHIS) to describe plants considered to be a threat to agriculture and/or non-crop areas. To be considered noxious, a plant has to be listed on a noxious weed list maintained by one or both of these agencies. In California, CDFA has started to also list invasive plants based on their threat or impact to wildlands. The Nevada Department of Agriculture also maintains a list of noxious and invasive species. Because the project area abuts Nevada state lands and in many areas shares identical ecological niches, the HTNF also refers to the Nevada state list when developing treatment priorities and goals (see Table 3).Both California and Nevada classify invasive and noxious weeds as a method of prioritizing their control and publishes lists by classification (Class A through C). The HTNF incorporates this list as they apply to National Forest System lands.

- Class A weeds are typically given the highest priority for treatment. These weeds either currently do not occur in the state or occur in such low numbers that eradication is considered possible. Prevention and eradication are the treatment goals for Class A weeds.
- Class B weeds are invasive weeds with populations of varying distribution and densities within the state. The level of mandated control is based on local conditions. These weeds may require eradication within certain areas of the state. Eradication and control are the treatment goals for Class B weeds.
- Class C weeds are widespread and common within the state. Control is generally the treatment goal for Class C weeds.

III. PROJECT LOCATION

The project area is located across the Bridgeport and Carson Ranger Districts in Alpine, El Dorado, Lassen, Mono, Nevada, Placer, Plumas, Sierra, and Tuolumne counties, California (Figure 1). The integrated weed management plan would provide direction for treatment of noxious and invasive weed species across approximately 693,721 acres on the two ranger districts and located in California (Table 1). Figure one provide a vicinity map that illustrates the project area. Figures 2 - 4 show the current locations of invasive weed populations in the northern, central, southern parts of the project area.

Figure 1. California Integrated Weed Management Project Area-Humboldt-Toiyabe National Forest

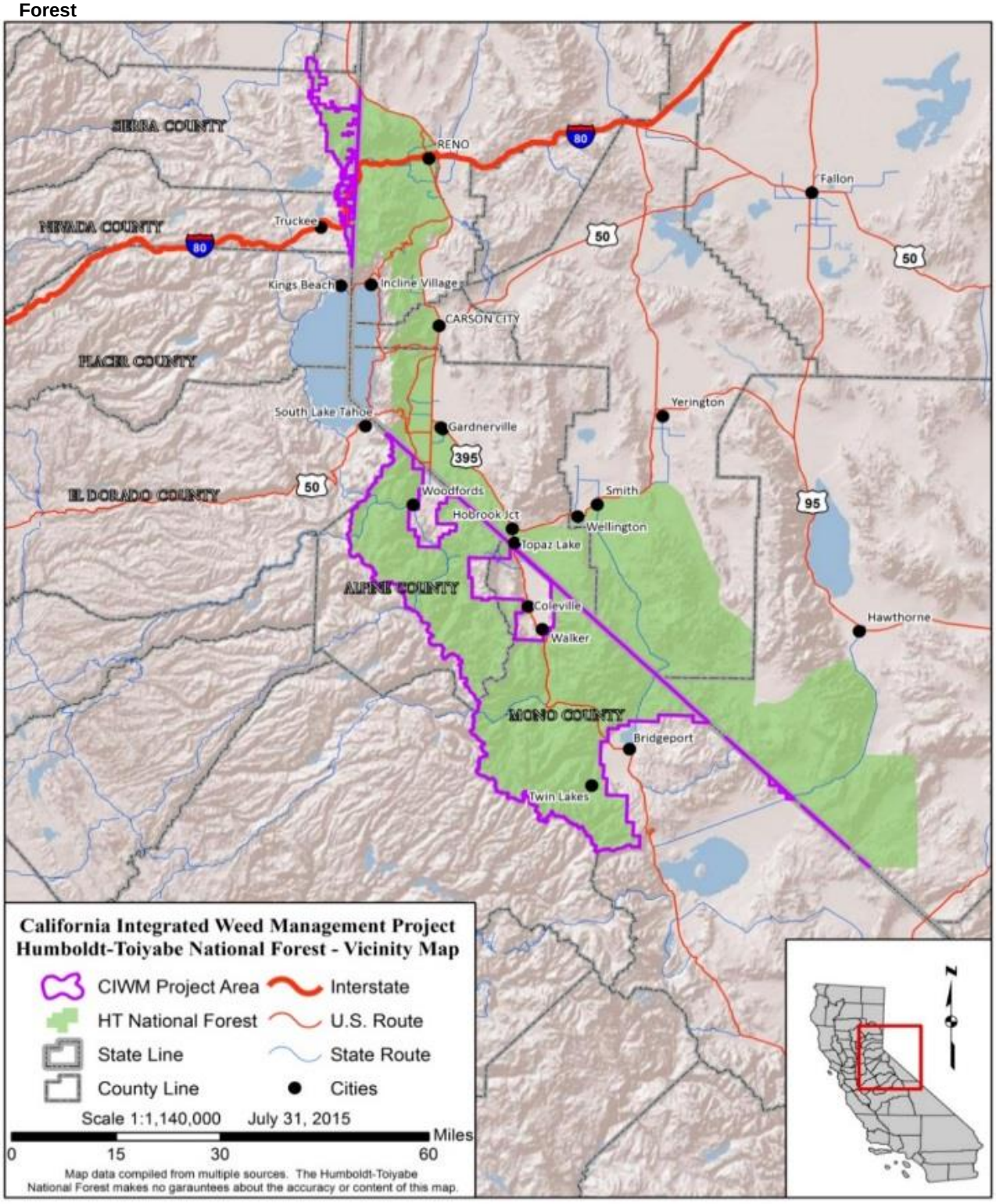


Figure 2. Current invasive weed populations within the northern portion of the project area

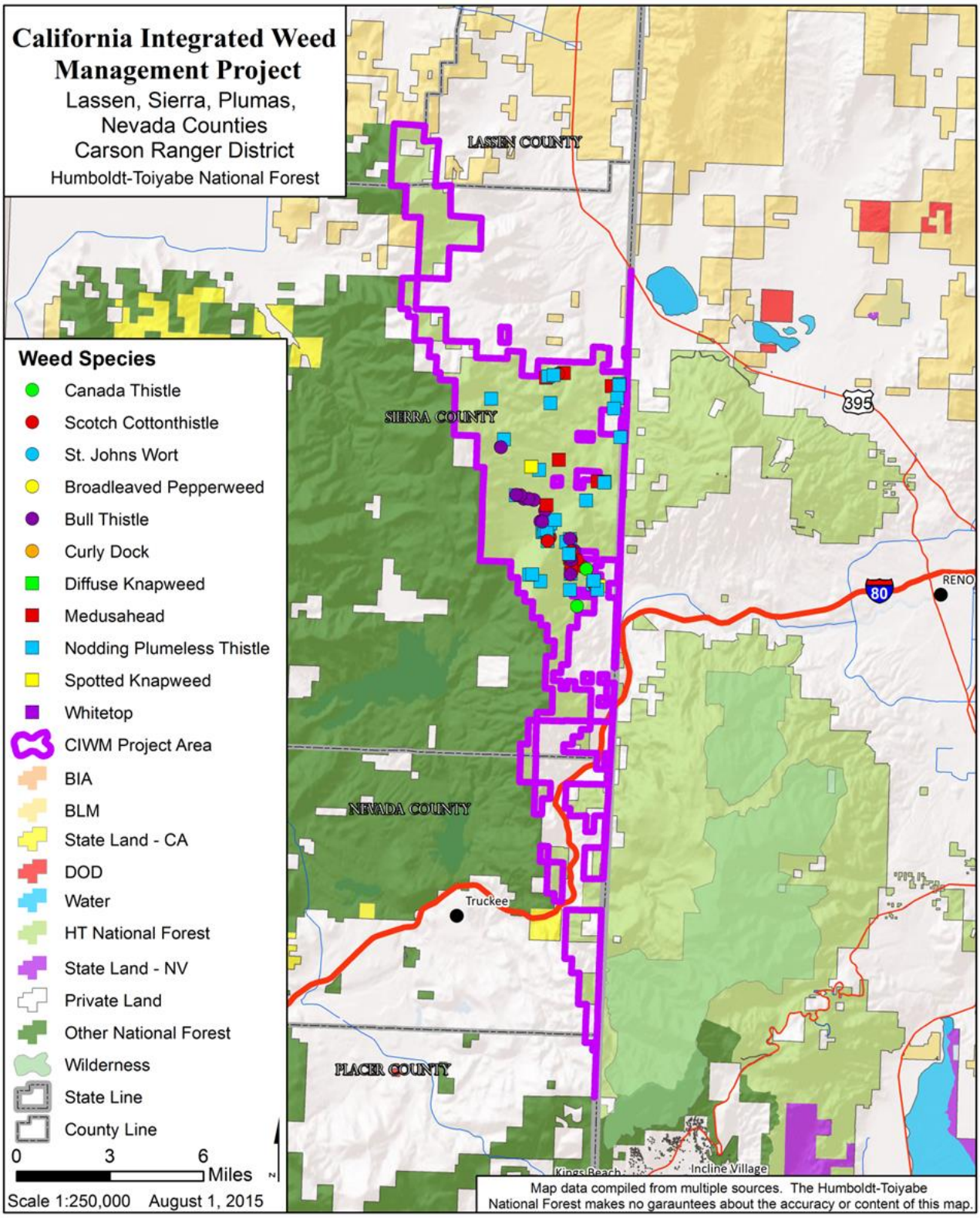


Figure 3. Current invasive weed populations in the central portion of the project area

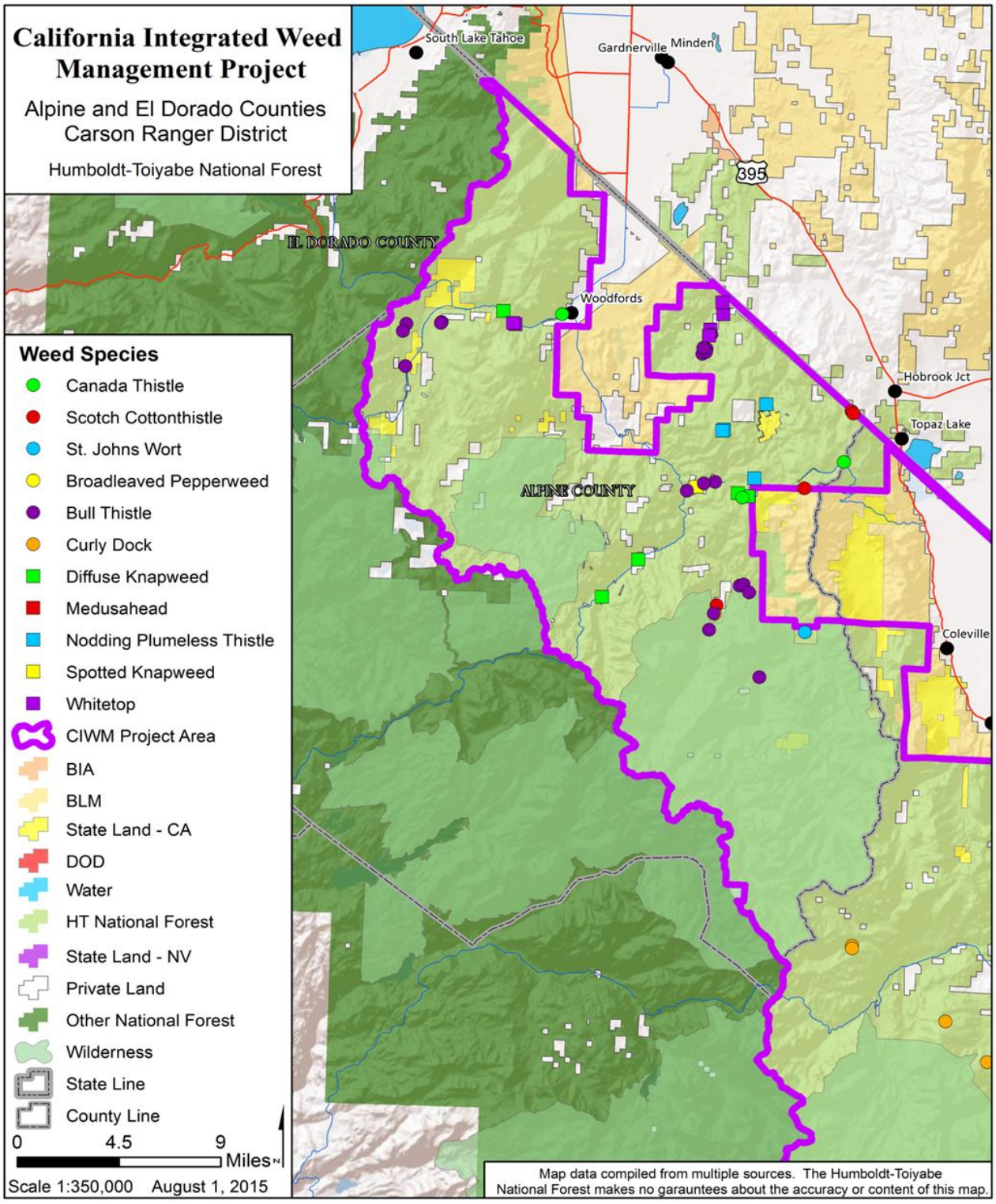


Figure 4. Current invasive weed populations in the southern portion of the project area

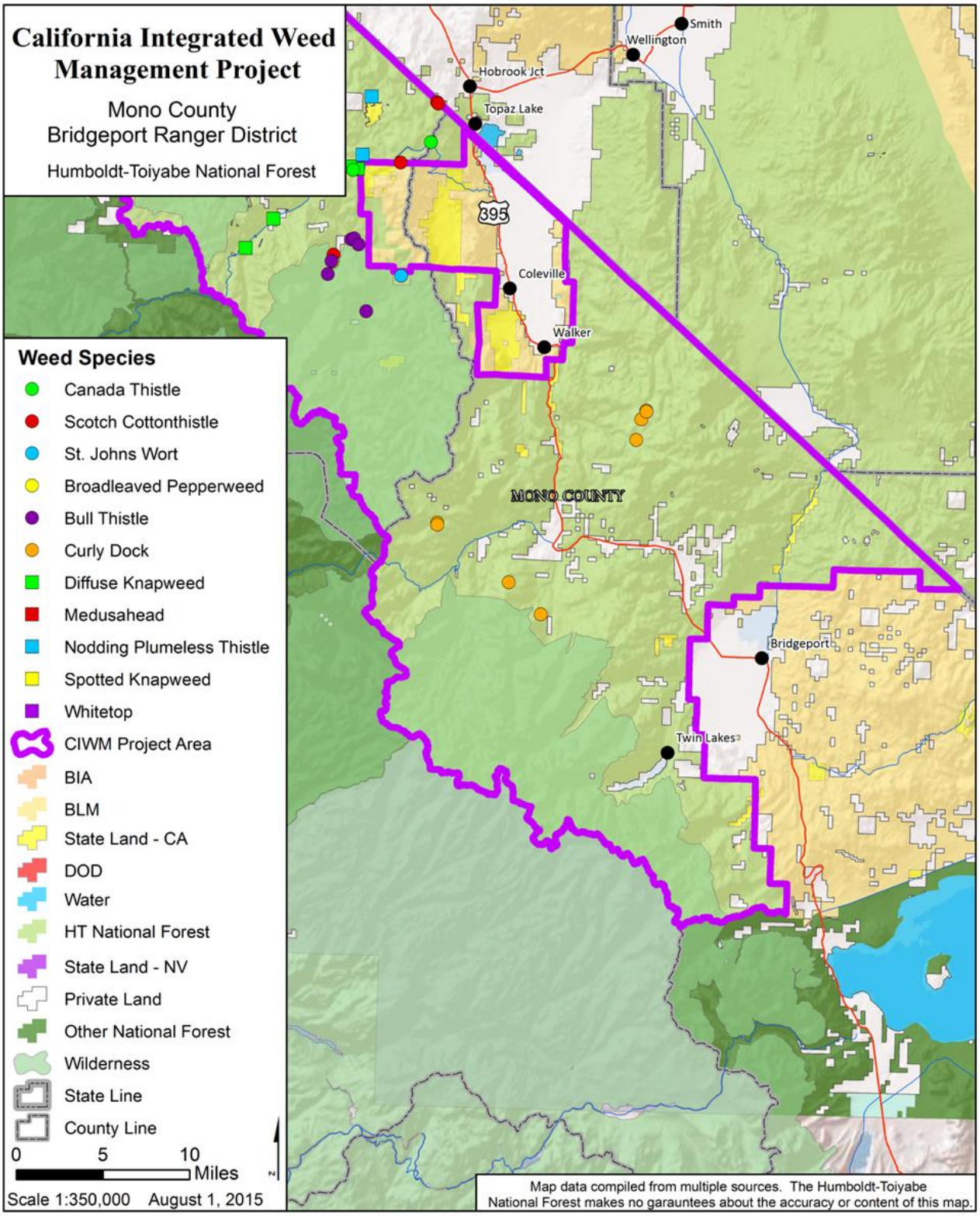


Table 1. Acres of Humboldt-Toiyabe National Forest (HTNF) System Lands that occur within California (Project Area).

County	Ranger District	Acre of Land in California within HTNF Jurisdiction
Lassen	Carson	1,616
Plumas	Carson	7
Nevada	Carson	4,369
Sierra	Carson	30,029
El Dorado	Carson	45
Placer	Carson	68
Alpine	Carson	254,459
Mono	Bridgeport	402,808
Tuolumne	Bridgeport	320
TOTAL:		**693,721**

IV. CONSULTATION TO DATE

As part of the Public Scoping process, the Notice of Proposed Action for this project was sent to the FWS for review and comment on December 2015. No comments were received from the Service at this time. Since the release of the scoping document, several general, informal discussions about this project have been conducted between staff members of the U.S. Forest Service and FWS regarding this project (Maureen Easton, Wildlife Biologist, Chad Mellison, Fisheries Biologist and Sarah Kulpa, Botanist). On August 25, a pre-consultation meeting was held between the Forest Service (Maureen Easton, Rachel Van Horne-fisheries, Tim Kellison-botany) and FWS personnel (Chad Mellison, Marcy Haworth, Sarah Kulpa) to discuss the Draft Biological Assessment. Based on these discussions, several components of the proposed action and corresponding design features were revised to provide a more thorough and conservation-based approach to minimizing impacts to Threatened and Endangered Species that are known to occur in the project area.

In addition to the above, species lists for Threatened, Endangered, and Proposed (TEP) species with potential to occur in the project area were obtained using the FWS online consultation program IPAC on May 13, 2015 (Reference #: 08ENVD00-2016-SLI-0341; 08ESMF00-2016-SLI-1463; 08ENVD00-2016-SLI-0340; 08ESMF00-2016-SLI-1462). The above species list also included two candidate species for listing, Sierra Nevada red fox (*Vulpes vulpes necator*) and *Pinus albicaulis* (whitebark pine). These species are also considered as Forest Service Sensitive in the Intermountain Region (Region 4) and will be analyzed separately in a Biological Evaluation.

Updated species list for this project were obtained on March 20, 2017 (08ENVD00-2017-E-00492; 08ESMF00-2017-E-03674; 08ENVD00-2017-E-00490; 08ESMF00-2017-E-03673). The updated lists included one additional species that was not on the original lists: North American wolverine (proposed threatened). These lists suggested the following species may have potential to occur in or near the project area:

- Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*) (T),
- Paiute cutthroat trout (*Oncorhynchus clarkii seleniris*) (T),
- Cui-ui (*Chasmistes cujus*) (E)
- Delta smelt (*Hypomesus transpacificus*) (T)
- Steelhead trout (*Oncorhynchus (=salmo)mykiss*) (T)

- Sierra Nevada yellow-legged frog (*Rana sierrae*) (E)
- Yosemite toad (*Anaxyrus canorus*)(T)
- Sierra Nevada bighorn sheep (*Ovis canadensis sierrae*)(E)
- North American wolverine (*Gulo gulo luscus*) (PT)
- Yellow-billed cuckoo (*Coccyzus americanus*) (T)
- *Ivesia webberi* (Webber ivesia) (T)
- *Orcuttia tenuis* (slender orcutt grass) (T)

V. SPECIES EVALUATED FOR BIOLOGICAL ASSESSMENT

A thorough review was conducted for the species listed above to more accurately determine the potential for each species to occur within the project area. The review included examining current species distribution and habitat maps listed in state and federal databases, reviewing available and most current literature, as well as using professional knowledge of species occurrences on the HTNF. Based on this review only the following species from the FWS Species List referenced above have potential to occur within the project area and will therefore be evaluated in this Biological Assessment:

- Lahontan cutthroat trout
- Paiute cutthroat trout
- Sierra Nevada yellow-legged frog
- Yosemite toad
- Sierra Nevada bighorn sheep
- North American wolverine
- *Ivesia webberi*.

The following species will not be included in this analysis as the project area is not within their current or historic distribution: Cui ui, Delta smelt, steelhead trout, yellow-billed cuckoo, and slender orcutt grass.

VI. CURRENT MANAGEMENT DIRECTION

Current management direction or desired future conditions for Threatened and Endangered species on the HTNF can be found in the following documents, filed at the District Office:

- Forest Service Manual and Handbooks (FSM/H 2670)
- National Forest Management Act (NFMA)
- Endangered Species Act
- National Environmental Policy Act (NEPA)
- Humboldt National Forest Land and Resource Management Plan (LRMP)
- Sierra Nevada Forest Plan Amendment (2001, 2004)
- Recovery Plans for Paiute cutthroat trout and Lahontan cutthroat trout
- Conservation Assessments and Strategies for Sierra Nevada yellow-legged frog and Yosemite toad
- Conservation Strategy for *Ivesia webberi*
- Recovery Plan for the Sierra Nevada bighorn sheep
- Federal Register rulings (50 CFR Part 17)for Sierra Nevada yellow-legged frog, Yosemite toad, Sierra Nevada bighorn sheep, North American wolverine, and *Ivesia webberi*

VII. PROPOSED ACTION

The Proposed Action includes annually treating a portion of the invasive plant infestations that occur in California on the Humboldt-Toiyabe National Forest. The number of infestations and acres treated each year will depend upon available funding. Treatments would involve integrated prescriptions that generally combine the use of herbicides with mechanical, manual, and biological control methods over several years. The proposed action would include treating existing populations as well as any future infestations that might occur.

A. Implementing Treatment Strategies

Based in part on the California and Nevada State classification systems discussed in Section II, for each known invasive plant infestation, and for future infestations that may be discovered, one of three treatment strategies is proposed:

- Annually treat and monitor the infestation with the goal of eradication.
    - Infestations of species documented as highly invasive with severe or substantial ecological impacts in California and those that are currently limited in their distribution and abundance on the Forest making their eradication an achievable goal.
- Treat and monitor a portion of the identified occurrences each year, focusing on reducing the area coverage and amount over time (eradicate/control).
    - Under this strategy, invasive plant species would be annually treated, focusing first on eradicating and then containing the most isolated, outlying occurrences and, over time, reducing the footprint of larger, less isolated occurrences. Treatments will also be designed to contain infestations along transit routes in order to prevent these invasive plants from moving into natural forest settings. Where appropriate, restoration and reclamation activities would be designed to lower spread potential.
- Treat only leading edge infestations or where concurrent with higher priority species (control)
    - Under this strategy targeted efforts to control, contain or eradicate certain species would be a lower priority for one or more of the following reasons: 1) the species is less invasive and unlikely to create large monocultures on NFS lands; 2) the species cannot be feasibly addressed with available treatments at the Forest- wide scale; or 3) the species is not causing significant ecological impacts.

Criteria for prioritizing treatment sites, given limited funding, will follow the following guidelines:

- Infestations with a high potential for future spread (prolific species found in high traffic areas such as administrative sites, trailheads, major access points for the forest, and systems vulnerable to invasion (recent fires)
- High value areas (such as TEP habitat; Wilderness, etc) and portals to these areas
- Early invaders with small isolated infestations on the forest.
- Leading edge and satellite occurrences of larger more established infestations
- Treating the perimeter of larger infestations

Using the above criteria, in addition to other site specific information, the HTNF will focus on 13 non-native invasive species (Table 2) for treatment and monitoring. Of the 13 species listed below, 10 are included on both the California and Nevada State Noxious Weed lists. Where the classification goal differs between the States (prevention, control, eradicate); site specific information and local knowledge

of infestations was used to determine a treatment goal. For reference the classification system is provided again below:

- Class A weeds are typically given the highest priority for treatment. These weeds either currently do not occur in the state or occur in such low numbers that eradication is considered possible. Prevention and eradication are the treatment goals for Class A weeds.
- Class B weeds are invasive weeds with populations of varying distribution and densities within the state. The level of mandated control is based on local conditions. These weeds may require eradication within certain areas of the state. Eradication and control are the treatment goals for Class B weeds.
- Class C weeds are widespread and common within the state. Control is generally the treatment goal for Class C weeds.

Table 2. Priority weed species for treatment and associated treatment goal

Weed Species	Mapped acres on HTNF Lands in CIWMP area	Number of Individual Locations	CA State Weed List Category	NV State Weed List Category	Treatment Goal	Species Description
Russian Knapweed (*Acroptilon repens*)	0	0	B	B	Prevention	Perennial weed that has a creeping root system. It reproduces by roots and seed. Manual treatments (hand pulling) effective for small populations; pre-emergent (fall) herbicide applications for larger more established populations
Diffuse Knapweed (*Centaurea diffusa*)	2	12	A	B	Control/ Eradicate	Tap-rooted biennial, occasionally annual or short-lived perennial forb that reproduces by seed. Can be hand pulled in spring before flowering; spring herbicide application for larger populations; mowing ineffective
Spotted knapweed (*Centaurea maculosa*)	5	4	A	A	Control/ Eradicate	Short lived perennial that reproduces solely by seed. Same treatment as diffuse knapweed
Musk Thistle (nodding plumeless thistle) (*Carduus nutans*)	462	57	A	B	Control	Biennial weed that has a deep, fleshy taproot and reproduces by seed. Herbicide application during reproductive period most effective treatment method; Insect Bio-control
Scotch Thistle (*Onopordum acanthium*)	12	21	A	B	Control	Biennial weed that reproduces by seed. Can form dense stands that are difficult to penetrate. Herbicide application of rosettes in fall most effective
Bull Thistle (*Cirsium vulgare*)	234	62	N/A	N/A	Control	Short-rooted biennial weed that reproduces by seed; hand pulling very effective; herbicide application of rosettes in fall or spring also effective; insect bio-controls effective.
Canada Thistle (*Cirsium arvense*)	8	19	B	C	Control	Perennial weed that has a deep, extensive creeping root system. Repeated mowing followed by herbicide most effective; several effective insect bio-controls
Yellow-Star Thistle (*Centaurea solstitialis*)	4	3	C	A	Control/ Eradicate	Annual weed that reproduces by seed and can have a long tap root. Mowing and hand pulling effective if at right time; targeted grazing and insect bio-controls can be very effective

Weed Species	Mapped acres on HTNF Lands in CIWMP area	Number of Individual Locations	CA State Weed List Category	NV State Weed List Category	Treatment Goal	Species Description
Perennial Pepperweed (broad-leaf pepperweed) (*Lepidium latifolium*)	12	5	B	C	Control	Perennial weed that has a creeping root system and can be found in moist areas and pastures. Hand pull for small infestations (a few plants); targeted grazing followed by herbicide application;
Hoary Cress (whitetop) (*Cardaria draba*)	204	19	B	C	Control	Perennial weed that reproduces through roots and seed. Hand pull small infestations; mowing and herbicide
Medusahead (*Taeniatherum caput-medusae*)	223	13	C	B	Control	Annual invasive grass that reproduces by seed. Mowing, prescribed fire, herbicides can all be effective treatment
Cheatgrass (*Bromus tectorum*)	unknown	unknown	N/A	N/A	Control	See medusahead; targeted grazing also effective
Curly dock(*Rumex crispus)* [1]	unknown	unknown	N/A	N/A	Control	Perennial prolific seed producer; occurs in drainages and wetter portions of pastures; hand pulling/digging or herbicide treatments

1 Curly dock is not on the California or Nevada State Noxious Weed List ; however, this species has been documented in TEP species habitat within the project area.

Noxious and invasive weeds are known to occur in occupied and critical habitat for several of the Threatened, Endangered and Proposed species analyzed in this report. However, current infestations within the project area occur in a relatively small percentage of habitat for these species (Table 3).

Table 3. Summary of noxious and invasive weeds that occur within occupied and critical habitat for threatened, endangered, and proposed species that occur or have potential to occur in the project area

TEP SPECIES	Occupied Habitat in Project Area	Acres Of Noxious Weeds in Occupied Habitat	Percentage of Occupied Habitat Infested	Acres of Critical Habitat In Project Area	Acres of Noxious Weeds in Critical Habitat	Percentage of Critical Habitat Infested
Lahontan Cutthroat Trout	53.11 stream miles	3.3[1]	6.2%	N/A	N/A	N/A
Paiute Cutthroat Trout	11.5 stream miles	0[1]	0%	N/A	N/A	N/A
Sierra Nevada Yellow-Legged frog	5,455 acres [2]	0	0%	30,442	.098	0.00032%
Yosemite Toad	25,044 acres [2]	0	0%	27,929	0	0%
Sierra Nevada Bighorn Sheep	4,239 acres[3]	0	0%	4,239	0	0%
North American Wolverine	N/A	N/A	N/A	N/A	N/A	N/A
Ivesia webberi	91 acres	.07	.08%	582	2.55	0.46%

[1] Acres of noxious weeds within 300 feet of occupied Lahontan and Paiute cutthroat trout habitat

[2] Actual occupied acres for Sierra Nevada yellow legged frog and Yosemite toad are unknown. Acres represent the Critical Habitat Units (CHU) as defined by FWS. CHUs are areas of critical habitat that contain PCEs for the species.

[3] Actual occupied acres are unknown so critical habitat acres were used.

B. Additional Details Of The Proposed Action

PREVENTION

A major component of the CIWMP will include incorporating measures into project planning and project implementation that prevent, or greatly reduce the potential for weeds to become established. To prevent the spread of noxious and invasive weeds, the following preventive measures will be incorporated into the CIWMP:

- **Noxious Weed Risk Assessment** –Forest Service Manual 2081.02 requires a noxious weed assessment be conducted when any ground disturbing action or activity is proposed to determine the risk of introducing or spreading noxious weeds associated with the proposed action. For projects having moderate to high risk of introducing or spreading noxious weeds, the project decision document must identify noxious weed control measures that must be undertaken during and/or before project implementation. The Risk Assessment includes information on current condition of the project area, potential risk of increased spread and design features to minimize potential for new infestations. The Assessment also determines if weed treatments need to occur prior to commencement of project activities.

- **Best Management Practices** (BMPs)-incorporate BMPS for weed prevention into all project planning efforts which include a ground disturbing component. BMPS include (but not limited to):
  - Require all construction vehicles to be inspected for weeds prior to entering work site
  - Set up weed wash stations and clean all equipment before leaving the project site if operating in areas infested with weeds.
  - All sand, gravel, borrow, and fill material will be inspected and certified weed free
  - Locate and use weed-free project staging areas. Avoid or minimize all types of travel through weed-infested areas, or restrict travel to periods when the spread of seeds or propagules is least likely;
  - To the extent feasible, design project areas to avoid known noxious weed infestations; if unavoidable then assess if pretreatment needs to be conducted prior to construction activities
  - Before ground-disturbing activities begin, inventory weed infestations and prioritize areas for treatment in project operating areas and along access routes;
  - Incorporate a post monitoring and treatment plan into all ground disturbing project planning efforts. Monitoring should continue for a minimum of five years after the project is completed to assure an Early Detection Rapid Response (EDRR) to new infestations.

- **Revegetation/Restoration** (following Forest Service Project Activities)-

  Revegetation will involve site preparation, such as raking to prepare a seed bed to promote seed germination, planting of seeds and/or propagules (depending on the species, this is done either in early spring or late fall to take advantage of available moisture), vigilant treatment

of invasive plants as they germinate from the existing seedbank, and monitoring the results. In some cases, a follow-up seeding/planting may need to be done.

Revegetation with carefully selected plant materials is a critical component of integrated weed management strategies. Commonly used control tactics, such as manual or chemical treatments, in effect create a disturbance on the current vegetation community. These control tactics may eliminate or suppress target invasive species in the short term, but the resulting gaps in vegetation and bare soil create open niches susceptible to secondary invasion by the same or other undesirable plant species. The spot method can leave sites open to secondary invasion since larger areas of vegetation are eliminated.

Spot spray areas would be reviewed and determination made about the need for active restoration. Areas with bare soil created by the treatment of invasive plants would be evaluated for restoration needs by a botanist and soil scientist. Revegetation would occur where needed to meet resource goals, including desired conditions for ground cover and native plant composition.

Determining the need for active restoration/revegetation versus passive restoration (allowing plants on site to fill in a treated area) is the first step when addressing this need. Passive restoration depends on re-colonization from the existing seedbank and from plant propagules dispersed from surrounding sources, as well as native species from within the invasive plant site. Passive restoration may be appropriate where treated sites leave relatively little bare ground or along less-disturbed roadsides where adjacent native vegetation can provide adequate seed source to recolonize treated areas.

Active revegetation is a long-term commitment that would be focused on areas that are either ecologically unique, or where active revegetation is necessary to provide competition for highly aggressive invasive plant species. In some cases, active restoration is not the preferred choice due to the nature of the site. Examples include continually disturbed areas, such as road shoulders that are frequently maintained, active landings, and river banks that are prone to annual scouring.

Old roadbeds, mining sites, are examples of sites that are unproductive but need stabilization. Revegetation may be difficult since these sites are not yet ready to support desired native vegetation. Applying groundcover with mulch stabilizes the site against erosion, while creating a weed barrier. For these extreme cases, the initial site stabilization methods are the first stage for future revegetation efforts. The following best management practices would be applied during any restoration efforts:

- Include weed prevention measures, including project inspection and documentation during project operations;
- Retain bonds until reclamation requirements, including weed treatments, are completed, based on inspection and documentation;
- To prevent conditions favoring weed establishment, re-establish vegetation on bare ground caused by project disturbance as soon as possible using either natural recovery or artificial techniques;
- Maintain stockpiled, weed-free material in a weed-free condition;
- Revegetate disturbed soil in a manner that optimizes plant establishment for each specific project site. Revegetation may include topsoil replacement, planting, seeding, fertilization, liming, and weed-free mulching, as necessary.

- Inspect seed and straw mulch to be used for site rehabilitation (for wattles, straw bales, dams, etc.) and certify that they are free of weed seed and propagules;
- Inspect and document all limited term ground-disturbing operations in weed infested areas for at least three growing seasons following completion of the project;
- Use native material where appropriate and feasible. Use certified weed-free or weed-seed-free hay or straw where certified materials are required and/or are reasonably available;
- Provide briefings that identify operational practices to reduce weed spread (for example, avoiding known weed infestation areas when locating fire lines);
- Evaluate options, including closure, to regulate the flow of traffic on sites where desired vegetation needs to be established.

INVENTORY

Information on the presence, location and distribution of noxious and invasive weeds is a key first step to all subsequent management efforts. Once located, noxious and invasive weeds would be mapped in GIS and recorded in the Forest Service FACTS database. Mapping provides information about the extent of the infestation, transport vectors, and the effectiveness of the control methods. Over the long-term, mapping can provide historical data for the epicenter of an infestation, rate and direction of spread.

CONTROL/ERADICATION

Manual Methods

Manual treatment involves the use of hand tools and hand-operated power tools to cut, clear, or prune herbaceous and woody species. Treatments include cutting noxious and invasive weeds above the ground level; pulling, grubbing, or digging out root systems of undesired plants to prevent sprouting and regrowth; cutting at the ground level or removing competing plants around desired species; or placing mulch around desired vegetation to limit competitive growth.

- **Hand Pulling:** Pulling or uprooting plants can be effective against some shrubs, tree saplings, and herbaceous invasive plants. Annuals and tap-rooted plants are particularly susceptible to control by hand-pulling. It is not as effective against many perennial invasive plants with deep underground stems and roots that are often left behind to re-sprout. The advantages of pulling include its small ecological impact, minimal damage to neighboring plants, and low (or no) cost for equipment or supplies.
- **Pulling Using Tools:** Most plant-pulling tools are designed to grip the plant stem and provide the leverage necessary to pull its roots out.
- **Clipping:** "Clipping" means to cut or remove seed heads and/or fruiting bodies to prevent germination. This method is labor-intensive and effective for small and spotty infestations.
- **Mulching:** Covering with certified "weed free and plastic free" mulch such as rice straw, grass clippings, wood chips, newspaper. Requires regular maintenance to assure mulch is maintained in targeted area.
- **Tarping:** Placing tarps to shade out weeds or solarize them (to injure by long exposure to heat of the sun). Requires regular maintenance to assure tarps are secure, intact and achieving desired results.

Mechanical Methods

- **Mowing-** Mowing is a suppression measure that can prevent or decrease seed head production. To be effective in treating invasive species such as annual grasses (cheatgrass), mowing needs to occur every two to three weeks until flowering is completed. Mowed weeds will re-grow and set seed from a reduced height so a combined control method is generally necessary to be effective. Mowing would be conducted using a small (700 lb) Bobcat ®-loader equipped with a mower attachment. Because mowing requires repeated treatments in the same year, can only be used on relatively flat (slopes less than 20%) and non-rocky terrain, this method will only be used in rare circumstances to treat small (less than 20 acres) infestations of invasive grasses. Mowing of invasive grasses over a small area produce minimal biomass and will not suppress native plant regeneration.
- **Cutting with a Hand-held String or Blade Trimmer:** Mowing or cutting with handheld gas or battery powered string or blade trimmer. Treatment method is essentially the same as described above for the Bobcat ® mower but would generally be used to treat much smaller areas (less than one acre). Again this treatment would be rarely used as it requires multiple cuttings to be effective and follow up treatments with other controls such as herbicide or biological controls.

Biological Controls

- Biological control involves using living organisms, such as insects or grazing animals to suppress weed infestations. This treatment method is generally most appropriate in situations where weed infestations are large and well established, and on sites where other control methods are not feasible. Biocontrol methods generally suppress host weed populations, but may not contain or eradicate them.
    - **Insects**-Biological control using insects is used to reduce a targeted weed population to an acceptable level by stressing target plants and reducing competition with the desired plant species. Insect agents are generally used for large expansive monocultures of noxious and invasive species. Insect agents including plant eating insects, nematodes, flies, mites and, pathogens typically require 3-5 years for establishment and can limit the spread and density of target weed species by feeding on leaves, stems, roots and/or seed heads. Insects can affect plants directly by destroying vital plant tissues and functions, and indirectly, by increasing stress on the plant, which may reduce its ability to compete with other plants. Often, several biological control agents are used together to reduce noxious and invasive weeds density to an acceptable level.

      Biological control agents, with the exception of certain microorganisms, are exempt from regulation by the Environmental Protection Agency (EPA). Biological control agents are permitted for release by the USDA Animal Plant Health Inspection Service (APHIS).

    - **Targeted Grazing**- Domestic animals, such as cattle, sheep, or goats, control the top-growth of certain noxious and invasive weeds which can help to weaken the plants and reduce the reproduction potential. The animals benefit by using the weeds as a food source and, after a brief adjustment period, can consume 50 percent or more of their daily diet of the weed, depending on the animal species. Although some Forest Service livestock grazing permits include authorizing cattle to graze invasive species such as cheatgrass, under the California Integrated Weed Management Project, livestock are only used under specific "targeted grazing" conditions. In targeted grazing, the kind of animals and amount and duration of grazing are specifically designed to help control a

particular species of plant while minimizing the impacts on perennial native vegetation that is needed to help reduce the likelihood of reinvasion by undesirable plant species. Targeted grazing includes the use of goats, sheep, or other livestock that have been specifically 'trained' by their operators to eat certain plant species. Generally the operator also uses a portable fencing system to help 'target' the animals on focal species. Grazing animals, either alone or in combination with other treatment methods, can be highly effective in reducing weed populations through the use of targeted grazing prescriptions.

Other Treatment Methods

Prescribed Burning- ***Prescribed burning will not be conducted in any occupied or critical habitat for TEP species.*** For the rest of the project area, prescribed burning would only be used in very limited situations where burning could help achieve management objectives. Prescribed burning is often used to control large expansive monocultures of cheatgrass and medusahead infestations. To be successful, burning almost always needs to be conducted with other weed treatments to remove vegetation other treatments (e.g. herbicide, seeding etc). A site specific burn plan and close consultation and coordination with a fuels specialist, would be completed before any prescribed burning activities occurred.

Herbicide Methods

Chemical treatment involves the application of herbicides (chemical compounds), via a variety of application methods, at certain plant growth stages to kill noxious and invasive weed species. Depending on the type of herbicide selected, they can be used for noxious and invasive weed control or complete eradication and may be used in combination with other control treatments. Selection of an herbicide for site-specific application would depend on its chemical effectiveness on a particular noxious or invasive weed species, habitat types present, proximity to water, and presence or absence of sensitive plant, wildlife, and fish species. Herbicides are most effective on pure stands of a single noxious or invasive weed plant where desirable and non-target plants are scarce or absent.

Chemicals can be used alone or in tank mixtures. Tank mixtures are only used if existing recommendations are available from State Department of Agriculture or other official resources such as Universities and or County cooperative extensions. If two or more different chemicals of the formulations are approved as a tank mixture on one or more of the labels, or have written recommendations for a tank mixture from the State Department of Agriculture, then it is permissible to tank mix these chemicals for a spray program. In addition to herbicides, a blue dye is added to tank mixtures to assist with monitoring the extent of the treatment coverage. The dye helps to reduce the chance of under and over application and would help detect and manage drift. Use of dye also reduces the risk to non-target species as a result of over application of herbicide and assures treatment of target species. Dye is water soluble, breaks down in sunlight, and washes away easily with water.

Herbicides would be used to control and eliminate new areas of noxious and invasive weeds spread and to contain the spread of existing infestations. Depending on the level of infestation, the type of weed species (e.g. deep rooted perennial or biannual) and/or its proximity to sensitive areas (e.g. water) herbicides can be applied through a variety of methods as described below:

- **Directed Broadcast/Spot Spray/Foliar spray-** Accomplished by sprayer wand with regulated nozzle in such a fashion that spray is concentrated at the target species. This is typically accomplished using a backpack sprayer.

- **Broadcast Spray-** Broadcast application (using truck/UTV mounted sprayers) over wider areas would be used only when necessary to treat large infestations. In some instances, broadcast spraying may be the only effective way to treat very dense and extensive weed infestations. When using broadcast spray drift reduction measures will be used. This will include low spray pressure of 30PSI or less, spray nozzles with large orifices. Wind speeds of 8mph or less and no treatment if inversions are present. Drift cards will be used to help monitor spray applications.
- **Hand/Selective-** Treatment of individual plants to avoid spraying other desirable plants. There is a low likelihood of drift or delivery of herbicides away from treatment sites. This method is used in sensitive areas, such as near water, to avoid getting any herbicide on the soil or in the water. Hand/Selective methods could be done under more variable conditions than spot spraying or broadcast spraying. Specific methods include:
    - Dip and clip – similar to cut stump, where cutting tool is first dipped in herbicide, then used to cut target species to be treated
    - Cut stump – herbicide is sprayed on cut surfaces to eliminate or greatly reduce re-sprouts;
    - Wicking and wiping – herbicide is wiped onto the target species using a wick applicator.

Proposed Herbicides

Seven herbicides are proposed for use in this project, using the application methods described above: **a*minopyralid, chlorsulfuron, glyphosate, imazapyr, tryclopyr, rimsulfuron* and *sulfometuron-methyl.***

When appropriate, herbicides with different modes of action can be used to treat invasive plant species. Alternating herbicide types can help reduce the risk of populations developing herbicide tolerance from repeated application with the same herbicide.

Only herbicides that have been approved for use in the state of California and have a label certifying that the chemical has been approved for use by the Federal Environmental Protection Agency (EPA) and the California Department of Pesticide Regulation (DPR), would be used. The EPA requires the manufacturers to conduct ecological risk assessments that include toxicity testing on representative species of birds, mammals, freshwater fish, aquatic invertebrates, and terrestrial and aquatic plants. An ecological risk assessment uses the data collected to evaluate the likelihood that adverse ecological effects may occur as a result of herbicide use.

The Forest Service also conducts its own risk assessments, focusing specifically on the type of herbicide uses in forestry applications. The Forest Service contracts with Syracuse Environmental Research Associates, Inc. (SERA) to conduct human health and ecological risk assessments for herbicides that may be proposed for use on NFS lands (SERA 2007). The SERA risk assessments represent the best science available, using peer- reviewed articles from the scientific literature and current U.S. EPA documents, such as Confidential Business Information, to estimate the risk of adverse effects to non-target organisms. The risk assessments consider worst-case scenarios including accidental exposures and application at maximum label rates. Once a risk assessment is completed, pesticide use proposals are submitted to the Forest Supervisor for approval. Only herbicides that have SERA risk assessments and approved Pesticide Use proposals are proposed in this action, with the exception of one chemical, rimsulfuron. Rimsulfuron is an effective herbicide in the treatment of annual grasses and is preferable over Sulfometuron-methyl due to its relative stability in soils and overall better environmental characteristics. The Forest Service is in the process of developing a Pesticide Use

Proposal for rimsulfuron. Once a USFS Pesticide Use Proposal is completed, the HTNF will no longer use sulfometuron-methyl and will replace it with rimsulfuron for the treatment of annual grasses.

Label directions, as well as all laws and regulations governing the use of pesticides, as required by the U.S. Environmental Protection Agency, the California Department of Pesticide Regulation, and Forest Service policy pertaining to pesticide use, would be followed. Coordination with the appropriate County Agricultural Commissioners would occur, and all required licenses and permits would be obtained prior to any pesticide application. The label contains information about the product, including its relative toxicity, potential hazard to humans and the environment, directions for use, storage and disposal, and first aid treatment in case of exposure. Label directions provide for public and worker safety by requiring posting of treated areas, pre-designation of mixing, storage and filling sites, and transportation and handling practices in accordance with toxicity of each formulation. Where herbicide treatments are proposed, the lowest effective label rates would be used. A site-specific safety and spill plan would be developed prior to herbicide applications.

The following is a short description of the proposed herbicides and their uses:

Aminopyralid-Aminopyralid is a pre- and post-emergent herbicide that can control a number of key invasive broadleaf species. Aminopyralid provides residual weed control activity, reducing the germination of target plants and the need for re-treatment. The herbicide has a lower effective application rate (compared to other registered herbicides) and a non-volatile formulation. Aminopyralid is labeled in California for use to the water's edge. For best results aminopyralid is generally applied to young weeds that are actively growing during time of application. It is proposed for use primarily on starthistles, knapweeds, and Canada thistle using directed foliar spray, broadcast spray or wicking. Broadcast spray would be limited to disturbed areas dominated by non-native species. A product example is **Milestone.**

Chlorsulfuron-Chlorsulfuron is a selective pre- and post-emergent herbicide used to control many broadleaf species. Chlorusulfuron would be used primarily as a post-emergent for use on tall whitetop, *(Lepidium latifolium)* and hoarycress (*Cardaria spp.*),using directed foliar spray or wiping. A product example is **Telar.**

Glyphosate-Glyphosate is a non-selective systemic herbicide that can control most annual and perennial plants. Glyphosate rapidly binds to soils, and is not readily absorbed by plants roots. Its non-selectiveness causes this herbicide to kill most plants where applied, including desirable native species. Plants can take several weeks to die and a repeat application in the same season is sometimes necessary to remove plants that were missed during the first application. Only formulations without a premixed surfactant are being proposed for use. Aquatic formulation of glyphosate can be used in aquatic settings. Product examples include **Accord, Rodeo** or **Aquamaster.**

Imazapyr-Imazapyr is a non-selective herbicide used for the control of a broad range of weeds including terrestrial annual and perennial grasses and broadleaved herbs, woody species, and riparian and emergent aquatic species. It can be applied pre-emergent, but is most effective when applied as a post-emergent herbicide. A product example is **Habitat**.

Triclopyr-Triclopyr is a selective post-emergent herbicide used to control woody and broadleaf plants. It is proposed for use primarily on woody species such as saltcedar (*Tamarix ramossissima*). Application for woody species would include cut stump, directed foliar spray or wiping. **Garlon 3A** is a product example.

Rimsulfuron- Rimsulfuron is an effective herbicide to control annual grasses such as cheatgrass and medusahead. It is absorbed through the plants leaves and translocated to the growing point of the plant. This product is designed to be used in dry areas and will not be used near any wet meadows, marshy areas, or riparian areas. This herbicide can be applied as a pre or post-emergent. **Matrix** is a product example.

Sulfometuron-methyl- Sulfometuron-methyl is a selective herbicide and will be used for pre-emergent control of annual grasses such as medusahead or cheatgrass. In some cases a mix of Sulfometuron methyl and chlorsulfuron (Landmark) will be use. This product is designed to be used in dry areas and will not be used near any wet meadows, marshy areas, or riparian areas. **Oust** is a product example. As mentioned above, this chemical will eventually be replaced by Rimsulfuron and no longer used on the HTNF.

Surfactants

Herbicide treatments would include the use of a surfactant to enable herbicide penetration of the plant cuticle (a thick, waxy layer present on leaves and stems of most plants). Surfactants are materials that facilitate the activity of herbicides through emulsifying, wetting, spreading or otherwise modifying the properties of liquid chemicals. Treatments would also include use of a dye to assist the applicator in efficiently treating target plants and avoiding contact with plants that have already been treated. A methylated seed oil surfactant, such as Hasten or Competitor, would be used as a surfactant and a water soluble dye, such as Highlight Blue, would be used as a dye. Both the surfactant and the dye are considered to be virtually non-toxic to humans.

MONITORING

Post-treatment monitoring will occur on all treatment sites to determine if treatment methods were successful. Level of success determinations will be commensurate with the treatment goal of the site (i.e. eradicate, control etc.). For example, if the objective was eradication, post-treatment monitoring would focus on a visual inspection of the treatment area for the presence or absence of the noxious or invasive weed species. This treatment would be considered successful when the target species is absent from its former location. Treatments designed to contain, control or suppress would be based on quantitative inspection (i.e. a reduction in percent cover or size of infestation of the noxious or invasive weed). If monitoring demonstrates that a treatment has not been effective, corrective actions (such as retreatment with the same or different method, or combination of methods) would be identified and implemented to enhance the level of success.

ANNUAL IMPLEMENTATION PROCESS

The Annual Implementation Process will include a yearly pre-treatment assessment of current weed conditions and will provide an annual plan for how, when, and where weeds will be treated. This process will include the coordination between the Forest Service Resource specialists and the District noxious weed program manager. The team will review up to date weed maps and proposed treatment areas and provide feedback on appropriate design features, special notifications, or other issues that may be associated with treatments. The Implementation Process will also help to prioritize treatment areas based on updated inventory information, proximity to sensitive areas, and/or the EDRR to newly discovered weed populations.

C. DESIGN FEATURES

The issue statements below are based on preliminary review and analysis from the ID team and provide information on potential resource issues related to the proposed action. From these issue statements, design features were developed and incorporated into the proposed action to avoid or minimize potential impacts from project activities. Design features are applied in conjunction

with pertinent management direction and guidelines. Design features listed below include only those pertinent to species analyzed in this Biological Assessment. For a complete list of Project Design Features associated with the project please see Appendix B.

Wildlife (Aquatic and Terrestrial)

Issue: Activities associated with treating noxious weeds may potentially affect aquatic and terrestrial wildlife species such as the Sierra Nevada yellow-legged frog, Yosemite toad, Lahontan and Paiute cutthroat trout, and Sierra Nevada bighorn sheep. Herbicides could affect these species directly and indirectly if over-concentrations of herbicide are applied or applied incorrectly. Other noxious weed treatments may also indirectly affect aquatic and terrestrial wildlife due to disturbance occurring during the breeding season, particularly if treatments include ground disturbing activities such as mowing and prescribed burning.

Aquatic Wildlife

31. During the Annual Implementation Process, the Forest Fisheries Biologist will review new treatment sites identified under EDRR that are within Sierra Nevada yellow-legged frog or Yosemite toad designated critical habitats or within 500 feet of known occurrences. Treatment strategies in these areas, including applying buffers, limited operating periods, and relocating individual amphibians, will be developed collaboratively an annual basis by the noxious weed coordinator and the Forest Fisheries Biologist to assure treatment efforts minimize impacts to frog and toad populations and critical habitat. The Forest Fisheries Biologist will also review new treatment sites that are with 300 ft of occupied Lahontan cutthroat trout or Paiute cutthroat trout streams to ensure treatment efforts follow design features outlined below.
32. Weed treatments within occupied, critical habitat, and potential breeding areas in suitable habitat for Sierra Nevada yellow-legged frog and Yosemite toad will consist only of manual methods (hand pulling, digging, clipping and bagging) or direct-hand application of herbicide (dip and clip, wick and wipe). Other manual methods, including tarping and mulching, will not be used within Sierra Nevada yellow-legged frog or Yosemite toad occupied or critical habitat. While these methods can be effective in controlling noxious weeds, they are not feasible to implement and maintain in the remote settings where Sierra Nevada yellow-legged frogs and Yosemite toads are located.
33. Immediately prior to any treatment activities in occupied habitat, a Forest Service biologist who is trained in identifying and handling rare amphibians, will survey the area for Sierra Nevada yellow-legged frogs and/or Yosemite toads. If individuals are found they will be relocated to a safe location that is nearby but out of potential harm's way from treatment activities. In most cases this will be less than 100 feet from the original location of the amphibian.
34. In occupied habitat, weed treatments will not be conducted within 50 feet of known breeding locations for Sierra Nevada yellow-legged frog and Yosemite toad until after metamorphosis has occurred. Metamorphosis typically occurs around July 31st but will be confirmed with a follow-up survey.
35. To minimize disturbance to Sierra Nevada yellow-legged frogs and Yosemite toads, treatments in occupied areas for these species may only occur on a maximum of ½ acre per year not to exceed 1/10 of an acre in any given location.

36. Within potential breeding areas considered suitable habitat for Sierra Nevada yellow-legged frogs (lakes and streams) or Yosemite toad (ponds and surrounding meadows), a maximum of ½ acre will be treated per year not to exceed 1/10 of an acre in any given location. If surveys determine the suitable habitat is not occupied, treatment acre limits would not apply.
37. When in proximity to Lahontan and Paiute cutthroat trout habitat, every effort will be made to treat weeds by manual methods. If it is determined the use of herbicides is the only practical method to treat weed infestations in these areas, only dip & clip and/or wicking & wiping applications of aquatic formulations of glyphosate or imazapyr will be used within 50 feet from occupied Lahontan and Paiute cutthroat trout habitat.
38. Tarping and mulching will not be used within occupied Lahontan and Paiute cutthroat trout habitat. While these methods can be effective in controlling noxious weeds, they are not feasible to implement and maintain in remote riparian settings.
39. Mechanical, biological control, and prescribed burn treatments will not occur within Paiute cutthroat trout occupied habitat due to the minimal weed infestations associated with their high alpine habitat and the logistical challenges associated with using these treatment methods in the wilderness (where Paiute cutthroat trout occur).
40. Prescribed burning will not occur within 300 feet of occupied habitat for LCT to eliminate the potential for inadvertent disturbance from burning operations to LCT and LCT habitat.
41. To minimize negative impacts to Lahontan cutthroat trout, mechanical methods such as mowing and targeted grazing will not be permitted within 50 feet of an occupied Lahontan cutthroat trout stream channel. This buffer will minimize the potential for any mowed clippings to enter the waterway and eliminate the potential for bank disturbance and erosion from targeted grazing.

Terrestrial Wildlife

42. During the Annual Implementation Process, the noxious weed coordinator will coordinate with the District and/or Forest wildlife biologist before each treatment season, to verify that treatments would not disturb breeding activity of any special status terrestrial wildlife species. Limited operating periods for all special status wildlife species will be implemented as necessary, based on the most current wildlife data from pre-project field surveys, or habitat suitability as determined by the District biologist.
43. To minimize disturbance to Sierra Nevada bighorn sheep, weed treatments will not be conducted in any occupied habitat during the lambing period which typically occurs between April and mid-July (USDI 2000).
44. To minimize the potential for conflict between domestic livestock and Sierra Nevada bighorn sheep, the use of domestic sheep and goats as biological controls will not be used on any occupied or designated critical habitat for Sierra Nevada bighorn sheep. The use of insect biological controls will also not be used in occupied and/or critical habitat for Sierra Nevada bighorn sheep.
45. To minimize potential disturbance to Sierra Nevada bighorn sheep and their habitat, the use of mechanical treatments (mowing, trimming) and prescribed burning to treat noxious weeds will not be used in Sierra Nevada bighorn sheep occupied and/or critical habitat.

46. Within Sierra Nevada bighorn sheep occupied and critical habitat, every effort will be made to treat weeds by hand pulling and or clipping and bagging. If herbicides are determined to be necessary to treat a weed population, they will be applied using hand application methods such as dip and clip or wick and wipe methods to avoid potential negative effects to sensitive sub-alpine native plant communities which are important to Sierra Nevada bighorn sheep.
47. Other manual methods, including tarping and mulching, will not be used within Sierra Nevada bighorn sheep occupied or critical habitat. While these methods can be effective in controlling noxious weeds, they are not feasible to implement and maintain in the remote settings where Sierra Nevada bighorn sheep are located.

Rare Plants

Issue: Noxious weed treatments could potentially affect non-target native plant communities including rare plant populations. The use of herbicides and potentially other treatment activities could impact individual plants as well as populations. Modification of the plant community structure and composition could impact sensitive plants and their habitats.

50. During the Annual Implementation Process, all noxious weed treatments proposed within 500 feet of *Ivesia webberi* populations and designated critical habitat would be reviewed by the District and/or Forest Botanist to verify that treatment strategies are consistent with project design features and management direction for this species.
51. When herbicide use is determined to be the most appropriate treatment method for broad leaved non-native plants (such as musk thistle) in occupied habitat for *Ivesia webberi*, direct hand application methods such as dip and clip or wick and wipe methods will be used to minimize potential for unintentional drift.
52. To minimize impacts to individual plants, herbicide treatment of non-native grasses within occupied and critical habitat for *Ivesia webberi* will occur in the fall when *Ivesia webberi* is dormant and plant foliage is no longer present.
53. To limit the potential for herbicide spills within *Ivesia webberi* habitat, no mixing and loading of herbicides would occur within occupied or critical habitat for *Ivesia webberi*.
54. All herbicide treatments in occupied and/or critical habitat will occur with hand held backpacks, spray wands, and other direct application equipment. Crew sizes will be limited to two people while conducting treatments. No vehicles such as spray trucks or UTVs will be used within *Ivesia webberi* habitat.
55. While in *Ivesia webberi* habitat, a small containment kit would be carried by herbicide applicators when wicking and wiping to further limit potential effects in the event of equipment failure (i.e. backpack leaking).
56. Mechanical treatments and prescribed burning will not be conducted within occupied habitat for *Ivesia webberi* to minimize the potential for inadvertent negative effects.
57. To minimize inadvertent damage to individual *Ivesia webberi* plants during digging and hand pulling treatments, weeds that cannot safely be pulled without damaging an Ivesia plant, would be treated by cutting and bagging the flower heads and using dip and clip or wick and wipe herbicide application methods to treat the additional stem.

58. Other manual techniques, including mulching and tarping, would not be used in occupied habitat for *Ivesia webberi* to avoid negative impacts to the species.

59. Prior to conducting weed treatments in unoccupied critical habitat for *Ivesia webberi*, surveys will be conducted within 500 feet of new weed infestations identified for chemical and biological treatment, and within 25 feet of new infestations identified for manual treatment. If *Ivesia webberi* plants are found, design features #50-58 and #61 will be implemented during treatment activities.

61. Where treatments occur within 500 feet of TEPCS (including *Ivesia webberi*) or HTNF Watch List plant occurrences, weed crews would be instructed in the proper identification of plant species to be avoided to ensure that individual TEPCS or HTNF Watch List plants are protected. The Forest Service District or Forest Botanist will accompany weed crews when treatments are conducted in occupied habitat for *Ivesia webberi*.

VIII. SPECIES ACCOUNTS

A. AQUATIC WILDLIFE SPECIES

I. Fish

PAIUTE CUTTHROAT TROUT

Range, Distribution, and Status: The historical distribution of the Paiute cutthroat trout (PCT) (*Oncorhynchus clarkii seleniris*) is limited to 9.1 miles of habitat on the Humboldt Toiyabe National Forest in the Silver King Creek watershed in Alpine County, California. In the early part of the 20th century, PCT were eliminated from much of their presumed historical habitat through displacement and hybridization with introduced rainbow trout, golden trout, and Lahontan cutthroat trout (Moyle 2002). In the early 1940's and 1950's, California Department of Fish and Wildlife introduced PCT into creeks outside the historic range on the Inyo and Sierra National Forests to establish refugia populations (USDI 2004). To date at least four self-sustaining populations have become established outside the historic drainage (USDI 2004). Paiute cutthroat trout were listed by the U.S. Fish and Wildlife Service as "endangered" in 1967 (USDI 1967) and then reclassified as "threatened" in 1975 to facilitate management (USDI 1975). There is no designated critical habitat for the Paiute cutthroat trout.

***Habitat Requirements and Natural History*:** Paiute cutthroat trout life history and habitat requirements are similar to those reported for other western stream-dwelling salmonids. All life stages require cool, well-oxygenated waters. Adult fish prefer stream pool habitat in low gradient meadows with undercut or overhanging banks and abundant riparian vegetation. Pools are important rearing habitat for juveniles and act as refuge areas during winter (Hickman and Raleigh 1982, Swales et al. 1986, Berg 1994). Paiute cutthroat trout spawn in flowing waters with clean gravel substrates (USDI 2004). They reach reproductive maturity at the age of two years. Peak spawning activity occurs in June and July. The eggs hatch in 6 to 8 weeks and the fry emerge from the gravel in another two to three weeks. Young-of-the-year fish rear in mainstem

shoals or backwaters, and often move into intermittent tributary streams until they reach about 50 mm in length. Like other trout, Paiute cutthroat trout feed mostly on a mixture of terrestrial and aquatic insects (Moyle 2002).

Potential for Occurrence within the Project Area: The project area includes the Silver King Creek watershed which currently encompasses almost the entire current range of Paiute cutthroat trout (Figure 5). The range of this species was extended into the upper reaches of Silver King Creek and its tributaries by one or more unofficial transplants above Llewellyn Falls starting in 1912 (Moyle 2002). Paiute cutthroat trout occupy approximately 20.6 miles of habitat in five widely distributed drainages (see Table 4). As part of recovery efforts, Paiute cutthroat trout will be reintroduced into approximately 9 miles of historic habitat between Llewellyn Falls and Silver King Canyon. Approximately 1,020 adult Paiute cutthroat trout reside in the Silver King Creek drainage, based on California Department of Fish and Wildlife (CDFW) population assessments in 2001 (USDI 2004). CDFW estimated approximately 424 fish in the Upper Silver King Creek above Llewellyn Falls, and an effective population size of 400-700 fish in Four Mile Canyon, Fly Valley and Corral Valley Creeks combined.

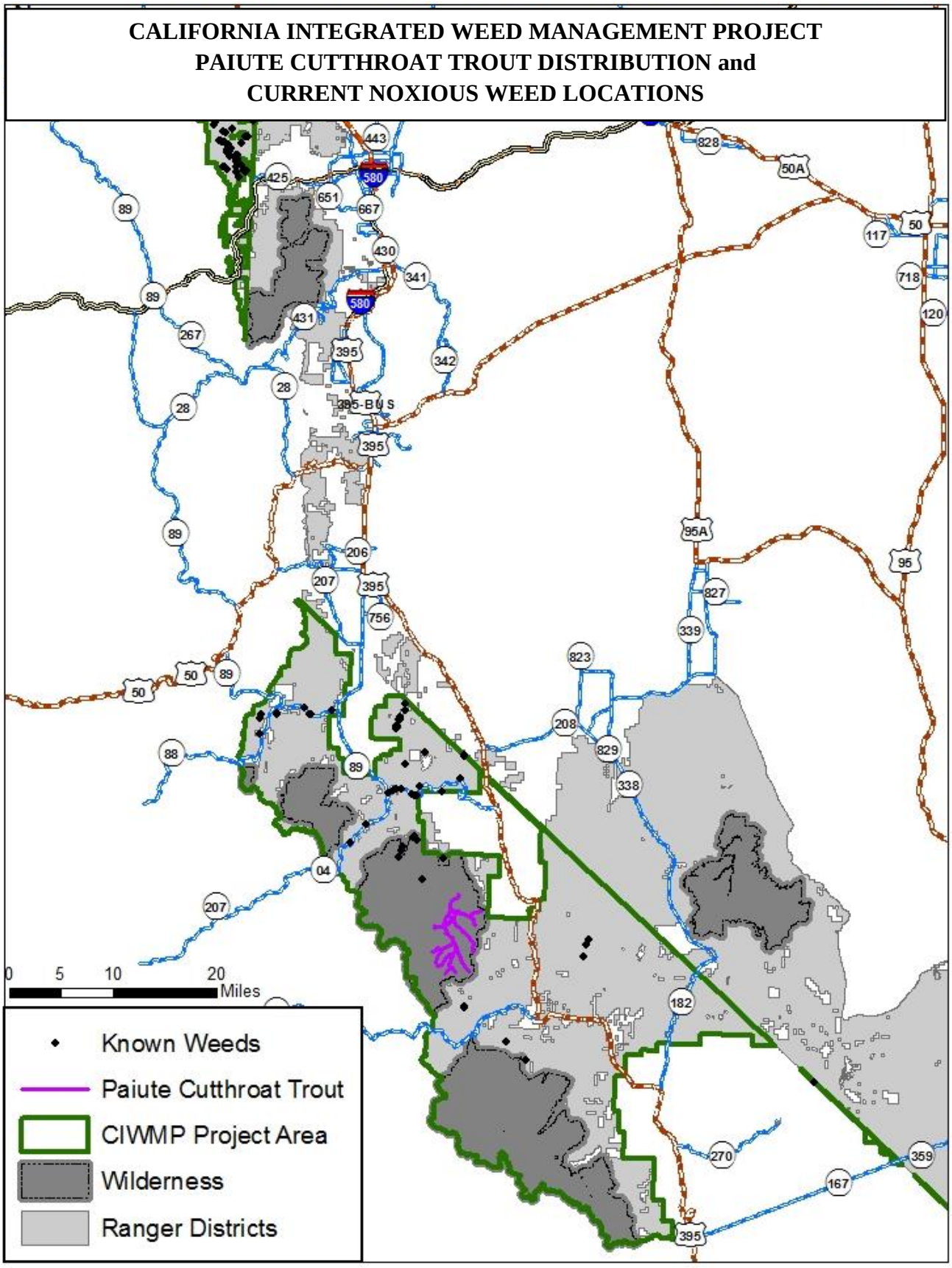
Threats: Historic threats include habitat loss due to past livestock grazing practices, introduction of rainbow trout, unregulated angling, and habitat alteration due to beavers (USDI 2004). Similar threats still exist with the exception of grazing. The HTNF no longer permits grazing in occupied or historic Paiute cutthroat trout habitats. Recreation occurs in and around Paiute cutthroat trout streams. Heavy recreation poses a risk to stream bank stability and trout habitat, however, this is not a current threat. Introduced trout pose the greatest risk to the sub-species. Effective fish barriers occur downstream of all remaining populations, but the threat of humans moving other trout species into these protected reaches continues.

***Current Noxious Weed Locations in PCT Habitat within the CIWMP Area*:** As mentioned above, PCT occur only in the Carson Iceberg Wilderness within the Silver King watershed. Currently there are no known noxious weeds within 300 feet of any occupied streams for Paiute cutthroat trout (see Table 4, Figure 5). At least three small (less than three acres) populations of bull thistle occur in other portions of the Carson Iceberg Wilderness area more than a mile away from occupied habitat for PCT. Although these weed populations are not considered an immediate threat to PCT habitat, under the proposed action they will be prioritized for treatment because they occur in a wilderness area.

Table 4. Acres of noxious weeds within 300 feet of occupied PCT streams within the CIWMP area

STREAM/RIVER	FS DISTRICT/ COUNTY	OCCUPIED STREAM MILES	WEED ACRES (within 300' of PCT stream)	WEED SPECIES	TREATMENT METHOD
Upper Silver King Creek	Carson/Alpine	2.7	N/A	N/A	N/A
Fly Valley Creek	Carson/Alpine	1.1	N/A	N/A	N/A
Four Mile Canyon Creek	Carson/Alpine	1.9	N/A	N/A	N/A
Bull Canyon Creek	Carson/Alpine	0.6	N/A	N/A	N/A
Coyote Valley Creek	Carson/Alpine	3.0	N/A	N/A	N/A
Corral Valley Creek	Carson/Alpine	2.2	N/A	N/A	N/A

Figure 5. Paiute Cutthroat trout distribution within the California Integrated Weed Management Project area



LAHONTAN CUTTHROAT TROUT (*Threatened*)

Range, Distribution, and Status: Historically, Lahontan Cutthroat trout (LCT) (*Oncorhynchus clarkii henshawi*), were endemic to the physiographic Lahontan basin of northern Nevada, eastern California, and southern Oregon (USDI 1995). In California, the subspecies historically occurred in the streams and lakes of the Lahontan system, on the east side of the Sierra Nevada (Moyle 1976). The current distribution is a fraction of the historic distribution. On the Carson and Bridgeport Ranger Districts, small isolated populations of LCT occur within the Carson River, Truckee, and Walker River Basins. Lahontan cutthroat trout were listed by the U.S. Fish and Wildlife Service as "endangered" in 1970 (Federal Register Vol. 35, p. 13520) and then reclassified as "threatened" in 1975 to facilitate management and allow angling (Federal Register Vol. 40, p. 29864). There is no designated critical habitat for LCT.

Habitat Requirements and Life History: Lahontan cutthroat trout inhabit both lakes and streams, but are obligatory stream spawners. Lahontan cutthroat trout habitat is characterized by well-vegetated and stable streambanks, stream bottoms with relatively silt-free gravel/rubble substrate, cool water, and pools in close proximity to cover and velocity breaks (USDI 1995). Lahontans occupy areas with overhanging banks, vegetation, or woody debris, and within stream cover (e.g., brush, aquatic vegetation, and rocks) is very important for juvenile survival Lahontan cutthroat trout generally spawn from April through July, depending upon stream flow, elevation, and water temperature (Calhoun 1943, La Rivers 1962, McAfee 1966, Lea 1968, Moyle 1976 *in* USDI 1995). Eggs are deposited in ¼ to ½ inch size gravel, and spawning beds must be well oxygenated and fairly silt-free for good egg survival. Fry will remain in shallow shore areas with hiding cover.

Lahontan cutthroat trout are opportunistic feeders, preying on aquatic and terrestrial invertebrates that occur in the drift (USDI 1995). Terrestrial prey items may make up a significant portion of the diet of trout in small headwater streams and meadows during the summer months (Ibid). In lakes, smaller trout feed primarily on surface insects and zooplankton and larger trout feed on other fish (USDI 1995). Other prey items include bottom-dwelling insect larvae, crustaceans, and snails (Ibid).

Potential for Occurrence: The Project Area includes the Western Lahontan Basin Geographic Management Unit (GMU) for LCT as defined by the U.S. Fish and Wildlife Service, which includes the Truckee, Carson, and Walker River drainages. Within the project area, LCT occur within stream and river channels that flow through a variety of habitat types and elevation zones (Table 5). On the Carson Ranger District, occupied streams and rivers include the following: Dog Creek (0.06 miles), South Branch Dog Creek (0.43 miles); East Fork Carson River (10.5 miles), Golden Canyon Creek (2.34 miles), Murray Canyon Creek (2.03 miles), Poison Creek (2.09 miles), West Fork Carson River (3.63 miles), and Wolf Creek (3.26 miles). On the Bridgeport Ranger District, occupied streams and rivers include the following By-Day Creek (2.6 miles), unnamed tributary to By-Day Creek (0.86 miles), East Walker River (3.24 miles), Mill Creek (5.73 miles), Murphy Creek (4.26 miles), unnamed tributary to Murphy Creek (0.65 miles), Silver Creek (4.87 miles), Slinkard Creek (3.21 miles), and the West Walker River (3.35 miles).

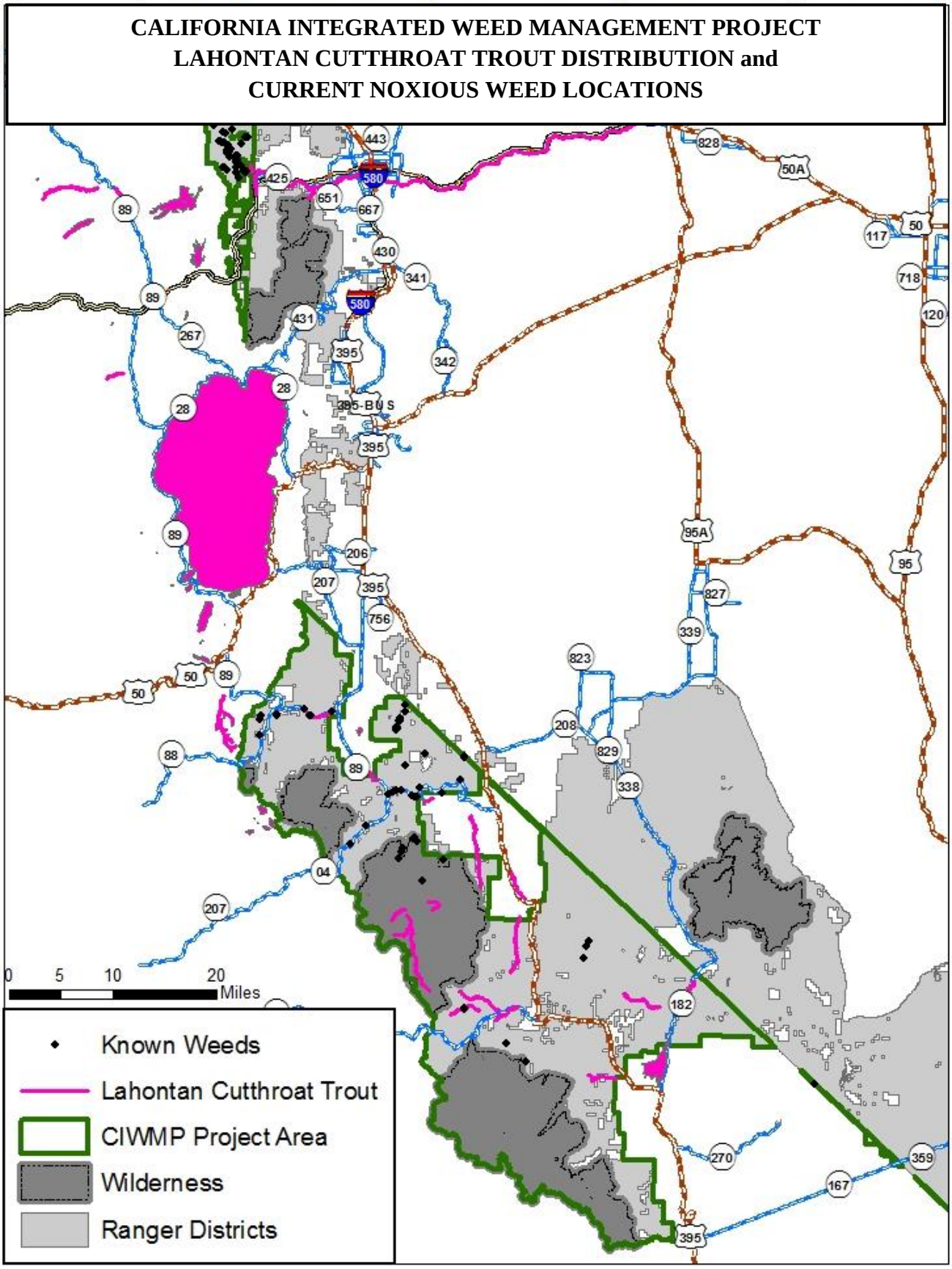
Threats: Threats to LCT include habitat loss associated with land management practices; reduction and alteration of stream discharge; alteration of stream channels and morphology; degradation of water quality; and hybridization or competition with non-native fish species (USDI 1995).

Current Noxious Weeds locations within LCT Habitat: Within the project area, there are currently three mapped weed infestations, totaling approximately 3.3 acres, within 300 feet of an occupied stream or river for LCT (see table 5, figure 6). Two of the infestations are located on the Carson Ranger District in Alpine County, CA and the third is located on the Bridgeport Ranger District in Mono County, CA. The Carson Ranger District infestations both occur near the West Fork of the Carson River in the Woodford's Canyon area and include a .09 acre patch of diffuse knapweed and a 3.19 acre infestation of perennial pepperweed. On the Bridgeport Ranger District, a small infestation (.098 acres) of curly dock occurs near the Wolf Creek drainage. Treatment strategy for the small population of diffuse knapweed would include hand-pulling only. Hand pulling is an effective treatment strategy for small populations of biennial and annual plants such as knapweeds as they are shallow-rooted and can be easily pulled. Perennial pepperweed and curly dock, however, are both long tap rooted perennial that can be difficult to hand pull effectively, particularly when there is more than just a few individual plants. Therefore, herbicides would be the likely method used to treat these infestations.

Table 5. Acres of noxious weeds within 300 feet of occupied LCT streams and rivers within the CIWMP area

STREAM/RIVER	FS DISTRICT/ COUNTY	LCT STATUS	OCCUPIED STREAM MILES	WEED ACRES (within 300' of occupied LCT stream)	WEED SPECIES	TREATMENT METHOD
By-Day Creek	Bridgeport/Mono	Current Population	2.6	N/A	N/A	N/A
Unnamed tributary to By-Day Creek	Bridgeport/Mono	Current Population	0.86	N/A	N/A	N/A
Dog Creek	Carson/Sierra	Current Population	0.07	N/A	N/A	N/A
South Branch Dog Creek	Carson/Sierra	Current Population	0.43	N/A	N/A	N/A
East Fork Carson River	Carson/Alpine	Current Population	9.71	N/A	N/A	N/A
East Fork Carson River	Carson/Alpine	Recreation Population	0.78	N/A	N/A	N/A
East Walker River	Bridgeport/Mono	Recreation Population	3.24	N/A	N/A	N/A
Golden Canyon Creek	Carson/Alpine	Current Population	2.34	N/A	N/A	N/A
Mill Creek	Bridgeport/Mono	Current Population	5.73	N/A	N/A	N/A
Murphy Creek	Bridgeport/Mono	Current Population	4.26	N/A	N/A	N/A
Unnamed tributary to Murphy Creek	Bridgeport/Mono	Current Population	0.65	N/A	N/A	N/A
Murray Canyon Creek	Carson/Alpine	Current Population	2.03	N/A	N/A	N/A
Poison Creek	Carson/Alpine	Current Population	2.09	N/A	N/A	N/A
Silver Creek	Bridgeport/Mono	Current Population	4.87	N/A	N/A	N/A
Slinkard Creek	Bridgeport/Mono	Current Population	3.21	N/A	N/A	N/A
West Fork Carson River	**Carson/Alpine**	**Recreation population**	**3.63**	**3.2**	**.0989 acres-diffuse knapweed 3.19-acres-Perennial Pepperweed**	**Hand-pull/ Herbicide**
West Walker River	Bridgeport/Mono	Recreation Population	3.35	N/A	N/A	N/A
Wolf Creek	**Bridgeport/Mono**	**Current Population**	**3.26**	**.098**	**Curly dock***	**Hand pull if possible/clip and bag/and or wick and wipe herbicide**
Totals:			**53.11 miles**	**3.3 acres**		

Figure 6. Lahontan Cutthroat trout distribution within the California Integrated Weed Management Project area



II. AMPHIBIANS

Analysis for the Sierra Nevada yellow-legged frog and Yosemite toad will be based on potential effects to three different habitat types: Occupied, Critical and Suitable. Definitions of these habitat types are provided below:

Occupied habitat consists of current know locations where Sierra Nevada yellow-legged frog and/or Yosemite toad have been identified through survey since 1980. Locations where Sierra Nevada yellow-legged frog and/or Yosemite have been identified through survey prior to 1980 are not considered currently occupied for this analysis. Within a stream reach, occupied habitat for Sierra Nevada yellow-legged frog consists of 0.62 miles (1 km) upstream and 0.62 miles (1 km) downstream of the location where the species has been found. It is important to remember that occupied habitat is not always designated critical habitat.

Designated Critical habitat includes the **primary constituent elements** required to sustain the species' life-history processes (USDI 2016a). For the Sierra Nevada yellow-legged frog, this includes stream and lake habitats (25 meters (82 ft) from the bank or shoreline). Areas between proximate (within 300 meters (984 ft) water bodies (typical of some high mountain lake habitats), the upland area extends from the bank or shoreline between such water bodies. For Yosemite toad, breeding habitat consists of bodies of fresh water, including wet meadows, slow-moving streams, shallow ponds, spring systems, and shallow areas of lakes, that: typically become inundated during snowmelt, hold water for a minimum of 5 weeks, and contain sufficient food for tadpole development. During periods of drought or less than average rainfall, these breeding sites may not hold water long enough for individual Yosemite toads to complete metamorphosis, but they are still considered essential breeding habitat because they provide habitat in most years. Upland habitat consists of areas adjacent to or surrounding breeding habitat up to a distance of 1.25 kilometers (0.78 mi). It is important to remember designated critical habitat is not always occupied.

Suitable habitat consists of areas within the analysis area that are outside of critical habitat but meet the habitat characteristics defined in the primary constituent elements. Due to the lack of comprehensive surveys and the cryptic nature of the species', occurrences are unknown in these areas. For the purposes of this analysis, effects to suitable habitat are focused on areas with potential breeding habitat for Sierra Nevada yellow-legged frogs and Yosemite toads.

Beginning in Fiscal year 2017, the Forest Service will conduct systematic monitoring for Yosemite toad and Sierra Nevada yellow-legged frog will occur across the Carson and Bridgeport Ranger Districts to determine occupancy within suitable habitat. For Sierra Nevada yellow-legged frogs, an area will be determined to be unoccupied when no individuals have been observed during at least three surveys within the previous 10 calendar years. The implementation of the three surveys will be either staggered during one summer with an early, mid, and late season survey (e.g. from 14 calendar days after sufficient habitat becomes free of snow at snowmelt to the fall before cold temperatures trigger movements to overwintering habitats), or conducted during three separate calendar years, that are ideally but do not have to be consecutive. At least one of the surveys will be conducted during a water year where snowpack is 80 percent or greater than normal for the area.

For the Yosemite toad, an area will be determined to be unoccupied when no individuals have been detected during at least three surveys within the previous 10 calendar years. At least one protocol survey will be completed each season for three consecutive years during the previous 10 years. Surveys will be conducted approximately 21 days to 35 days after breeding pools form at snow melt,

and at least one of the surveys will be conducted during a water year where snowpack is 80 percent or greater than normal for the area.

SIERRA NEVADA YELLOW-LEGGED FROG (*Endangered*)

Range, Distribution, and Status: Sierra Nevada yellow-legged frogs (SNYLF) historically inhabited ponds, tarns, lakes, and streams from 4,500 to over 12,000 ft. (1370 to over 3650 m) (Stebbins 1985) and was once the most common amphibian in high elevation aquatic ecosystems of the Sierra Nevada (Bradford et. al. 1993). This species is endemic to California and a small area of western Nevada and occurs in two distinct regions – the Sierra Nevada and several mountain ranges of coastal southern California. Large groups of populations in the northern Sierra Nevada and local populations elsewhere have since become extinct and have disappeared from 70-90% of its historic range in the bioregion (Jennings 1996). The current distribution of SNYLF extends from north of the Feather River (including the Plumas and southern edge of the Lassen National Forests) south to the Monarch Divide on the west side of the Sierra Nevada crest (Sierra National Forest) and near Independence Creek on the east side of the Sierra Nevada crest (Inyo National Forest).The Sierra Nevada yellow-legged frog was listed by the U. S. Fish and Wildlife Service as endangered in 2014 (USDI 2014a). Critical habitat was designated for this species in 2016 (USDI 2016a).

Habitat Requirements and Life History: The SNYLF inhabits a variety of habitats including lakes, ponds, tarns, wet meadows, and streams from near 4,500 ft. to 12,000 ft. (Zweifel 1955; Stebbins 1985; Vredenburg et al. 2005). Sierra Nevada yellow-legged frogs utilize a variety of different habitats throughout the year for breeding, feeding, and overwintering sites (Matthews and Preisler 2010).

Breeding habitat for SNYLFs typically occurs above 7,700 feet in elevation and includes permanent water bodies or those hydrologically connected with permanent water such as lakes, streams, rivers, tarns, perennial creeks (or permanent plunge pools within intermittent creeks), and pools (such as a body of impounded water contained above a natural dam). Most types of water are suitable habitat for adults and subadults including lakes, ponds, tarns, streams, rivers, creeks, plunge pools within intermittent creeks, seeps, springs, and wet meadows plus surrounding areas up to a distance of 25 m (82 ft). Where proximate water bodies occur within 300 m (984) feet of one another (typical of some high mountain lake habitat), suitable habitat for dispersal and movement includes the overland area between lake shorelines; in mesic habitats such as lake and meadow systems, the entire area of physically contiguous or proximate habitat is suitable for dispersal and foraging. Breeding occurs in the spring, from April to July depending on elevation, as soon as the ice on the lakes, ponds, and streams recedes. Females deposit eggs in clusters attached to vegetation, granite, and under undercut banks (Pope 1999, Vredenburg et al. 2004, Zweifel 1955). Females lay 40-300 eggs in a compact cluster. Emergence from the egg occurs after approximately 2-3 weeks. Tadpoles often congregate in the warm shallows near shore where they feed on algae. SNYLF tadpoles may overwinter 2-3 times before metamorphosing (Zweifel 1955; Vredenburg et al. 2005). Due to their long larval life stage breeding sites must remain a permanent water source year round.

After metamorphosis, SNYLF can remain juveniles for up to four years before reaching sexual maturity. Sierra Nevada yellow-legged frog are long lived with a maximum recorded estimated age of 14 years (Matthews and Miaud 2007). After breeding, adults may disperse into a larger variety of aquatic habitats (Pope and Matthews 2001). Sierra Nevada yellow-legged frog often

move hundreds of meters between breeding, feeding, and overwintering habitats (Pope and Matthews 2001). They appear to use a restricted set of lakes that provide suitable microhabitats for breeding and overwintering then disperse into a greater number of sites during the summer months for feeding (Matthews and Pope 1999, Matthews and Preisler 2010, Pope and Matthews 2001). Frogs can be found along shallow, rocky shorelines often interspersed with vegetation rather than areas with large boulders from talus slope or sandy unprotected shorelines (Mullally and Cunningham 1956). Sierra Nevada yellow-legged frog use a variety of cover including vegetation, logs, and partially submerged trees. Similar to tadpoles, adults and sub-adults seek areas with warmer water (Bradford 1984). In high elevation habitats, SNYLF may spend up to nine months overwintering under ice in lakes and streams. Frogs have been found overwintering in the bottoms of lakes and in protected nearshore microhabitats including deep underwater rock crevices under banks and under ledges (Bradford 1983, Matthews and Pope 1999).

Potential for Occurrence in the Project Area: On the Humboldt-Toiyabe National Forest the current known distribution of SNYLF extents from West Fork Carson watershed south to Virginia Lakes in the West Walker watershed. Most of the known occurrences of SNYLF are within designated critical habitat. In the 2016 Final Rule for Designating Critical Habitat for the Sierra Nevada yellow-legged frog and the Yosemite toad (USDI 2016a), critical habitat was divided into 26 sub units of critical habitat (Ibid). The project area consists of three of these sub units: East Amador, Emigrant Yosemite, and Wells Peak totaling 49,625 acres (see Table 6). Approximately 5,455 acres of those critical habitat acres consist of the Primary Constituent Elements (PCEs) for the species. Primary Constituent Elements are habitat features that are required to sustain the species' life-history processes and are as follows for the SNYLF (USDI 2016a):

(1) Aquatic habitat for breeding and rearing. Habitat that consists of permanent water bodies, or those that are either hydrologically connected with, or close to, permanent water bodies, including, but not limited to, lakes, streams, rivers, tarns, perennial creeks (or permanent plunge pools within intermittent creeks), pools (such as a body of impounded water contained above a natural dam), and other forms of aquatic habitat. This habitat must:

(a) For lakes, be of sufficient depth not to freeze solid (to the bottom) during the winter (no less than 1.7 m (5.6 ft), but generally greater than 2.5 m (8.2 ft), and optimally 5 m (16.4 ft) or deeper (unless some other refuge from freezing is available)).

(b) Maintain a natural flow pattern, including periodic flooding, and have functional community dynamics in order to provide sufficient productivity and a prey base to support the growth and development of rearing tadpoles and metamorphs.

(c) Be free of introduced predators.

(d) Maintain water during the entire tadpole growth phase (a minimum of 2 years). During periods of drought, these breeding sites may not hold water long enough for individuals to complete metamorphosis, but they may still be considered essential breeding habitat if they provide sufficient habitat in most years to foster recruitment within the reproductive lifespan of individual adult frogs.

(e) Contain:

(i) Bank and pool substrates consisting of varying percentages of soil or silt, sand, gravel, cobble, rock, and boulders (for basking and cover);

(ii) Shallower microhabitat with solar exposure to warm lake areas and to foster primary productivity of the food web;

(iii) Open gravel banks and rocks or other structures projecting above or just beneath the surface of the water for adult sunning posts; (iv) Aquatic refugia, including pools with bank overhangs, downfall logs or branches, or rocks and vegetation to provide cover from predators; and (v) Sufficient food resources to provide for tadpole growth and development.

(2) Aquatic nonbreeding habitat (including overwintering habitat). This habitat may contain the same characteristics as aquatic breeding and rearing habitat (often at the same locale), and may include lakes, ponds, tarns, streams, rivers, creeks, plunge pools within intermittent creeks, seeps, and springs that may not hold water long enough for the species to complete its aquatic life cycle. This habitat provides for shelter, foraging, predator avoidance, and aquatic dispersal of juvenile and adult mountain yellow-legged frogs. Aquatic nonbreeding habitat contains:

(a) Bank and pool substrates consisting of varying percentages of soil or silt, sand, gravel, cobble, rock, and boulders (for basking and cover);

(b) Open gravel banks and rocks projecting above or just beneath the surface of the water for adult sunning posts;

(c) Aquatic refugia, including pools with bank overhangs, downfall logs or branches, or rocks and vegetation to provide cover from predators;

(d) Sufficient food resources to support juvenile and adult foraging;

(e) Overwintering refugia, where thermal properties of the microhabitat protect hibernating life stages from winter freezing, such as crevices or holes within bedrock, in and near shore; and/or

(f) Streams, stream reaches, or wet meadow habitats that can function as corridors for movement between aquatic habitats used as breeding or foraging sites.

(3) Upland areas.

(a) Upland areas adjacent to or surrounding breeding and nonbreeding aquatic habitat that provide area for feeding and movement by mountain yellow-legged frogs.

(i) For stream habitats, this area extends 25 m (82 ft) from the bank or shoreline.

(ii) In areas that contain riparian habitat and upland vegetation (for example, mixed conifer, ponderosa pine, montane conifer, and montane riparian woodlands), the canopy overstory should be sufficiently thin (generally not to exceed 85 percent) to allow sunlight to reach the aquatic habitat and thereby provide basking areas for the species.

(iii) For areas between proximate (within 300 m (984 ft)) water bodies (typical of some high mountain lake habitats), the upland area extends from the bank or shoreline between such water bodies.

(iv) Within mesic habitats such as lake and meadow systems, the entire area of physically contiguous or proximate habitat is suitable for dispersal and foraging.

(b) Upland areas (catchments) adjacent to and surrounding both breeding and nonbreeding aquatic habitat that provide for the natural hydrologic regime (water quantity) of aquatic

habitats. These upland areas should also allow for the maintenance of sufficient water quality to provide for the various life stages of the frog and its prey base.

Table 6. Acres of Critical habitat for the Sierra Nevada yellow-legged frog within the CIWMP project area.

Unit	Unit Name	Total Critical Habitat Unit Acres	Critical Habitat Unit Acres within Project Area	Unit Acres within PCE's
2F	East Amador	107,278	13,136	2,214
2I	Emigrant Yosemite	212,798	15,005	940
2H	Wells Peak	28,913	21,484	2,301
	Total	**348,989**	**49,625**	**5,455**

Outside of critical habitat, approximately 13,091 acres of 'suitable habitat' occur throughout the project area. Suitable habitat is defined as areas that have unknown occupancy outside of critical habitat but include PCEs for SNYLFs (including potential breeding streams and ponds above 7,700 feet in elevation) (see Figure 7).

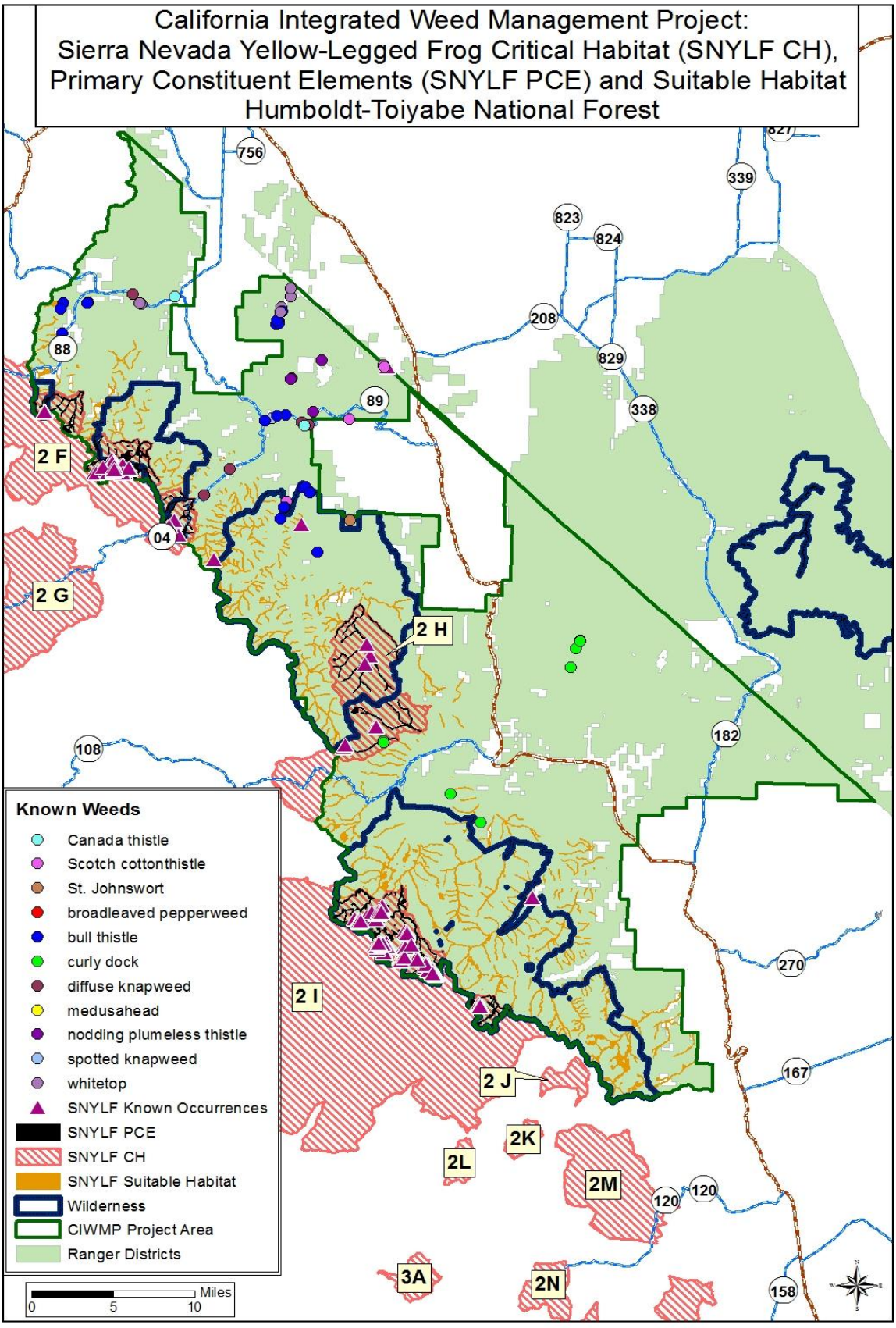
Threats: Threats to SNYLFs include: predation by introduced trout and disease. Sierra Nevada yellow-legged frogs historically occurred in mostly fishless lakes, which have been subsequently stocked for recreational purposes. Mountain yellow-legged frogs and trout (native or non-native) rarely coexist. The other cause of decline is the presence of disease, more specifically; chytrid fungus (*Batrachochytrium dendrobatidis*) which has been detected in many amphibian species, including the mountain yellow-legged frog within the Sierra Nevada. Recent research has shown that this pathogenic fungus has become widely distributed throughout the Sierra Nevada and mountain yellow-legged frogs often die soon after metamorphosis if infected (Rachowicz et al. 2006).

Current Noxious Weed Occurrences in SNYLF Habitat within the CIWMP Area: Within critical habitat for SNYLF, there is currently one small infestation (0.98 acres) of curly dock that occurs near the Wolf Creek drainage on the Bridgeport Ranger District (Table 7). While this infestation occurs within critical habitat for SNYLFs, it does not occur in occupied habitat or within habitat considered to contain PCE's for the species. Outside of critical habitat, a 14 acre infestation of bull thistle occurs in suitable habitat for SNYLFs. *Although this infestation has been mapped as 14 acres, the infestation actually occurs as several individual small populations within a 14 acre area and is not a contiguous patch of bull thistle. Treatment of this population would include hand pulling as well as potentially using herbicide treatments.

Table 7. Noxious weed infestations within critical and suitable habitat for SNYLF in the CIWMP project area

Habitat	Critical Habitat Acres within Project Area	Acres Of Noxious Weeds within Critical Habitat	CHU Acres with PCE's	Acres Of Noxious Weeds in PCE or Suitable Habitat	Weed Species	Treatment Method
East Amador CHU-2F	13,136	N/A	2,214	N/A	N/A	N/A
Emigrant Yosemite CHU—2I (Wolf Creek Bridgeport Ranger District)	15,005	.098	940	N/A	Curly dock	Hand pull if possible/ Clip and bag/herbicide wick and wipe
Wells Peak CHU-2H	2,301	N/A	2,301	N/A	N/A	N/A
Suitable Habitat	N/A	N/A	13,091	14*	Bull thistle	Hand pull/ herbicide

Figure 7. Habitat Designations and Distribution of the Sierra Nevada Yellow-Legged Frog with in the CIWMP area



YOSEMITE TOAD

Range, Distribution, Status: Historically, Yosemite toads (*Anaxyrus canorus*) occurred in the Sierra Nevada between 4,790 to 11,910 feet elevation from the Blue Lakes region north of Ebbett's Pass (Alpine County) to south of Kaiser Pass in the Evolution Lake/Darwin Canyon area (Fresno County). Several studies and observations made within the first half of the twentieth century report that Yosemite toads were abundant throughout their range, especially within Yosemite National Park (Grinnell and Storer 1924). As of the mid-1990's it had declined substantially or disappeared from over 50% of the sites where it was known historically (Jennings 1996). Yosemite toads were listed by the U.S. Fish and Wildlife Service as threatened in 2014 (USDI 2014a) Critical habitat was designated for this species in 2016 (USDI 2016a).

Habitat Requirements and Life History: Yosemite toads are most likely to be found in areas with thick meadow vegetation or patches of low willows near or in water, and use rodent burrows for overwintering and temporary refuge during the summer. Breeding habitat includes the edges of wet meadows, slow-flowing streams, shallow ponds, and shallow areas of lakes. Following snow melt, Yosemite toads breed and lay eggs in shallow pools within high elevation wet meadows. These breeding pools are occupied by toads through the egg and tadpole life stages, which is approximately 6 to 8 weeks from May through August depending on weather conditions. After metamorphosis, the young of the year generally remain within the immediate rearing area until hibernation. Suitable breeding and rearing habitat occurs above 7,700 ft in elevation and includes wet portions of meadows, slow-moving streams, shallow ponds, spring systems, and lakes with shallow areas that are inundated at snowmelt and hold water for a minimum of 5 weeks during most years. Some suitable sites may not retain water long enough for completion of metamorphosis in drought or below average precipitation years. Suitable non-breeding habitats include all portions of meadows and surrounding areas up to a distance of 1.25 km (0.78 mi) depending on surrounding landscapes and dispersal barriers. In some cases, additional habitat may be important for dispersal.

Potential for Occurrence in the Project Area: On the Humboldt-Toiyabe National Forest the current distribution of Yosemite toads extends from the Kinney Lakes area in Alpine County, CA south to Virginia Lakes in Mono County, CA. Hybridization with western toads has occurred along northern edge of the species distribution on the HTNF (Mullally and Powell 1958). Most of the current occurrences are within critical habitat. Within the project area, there are four different critical habitat units: Blue Lakes/Mokelumne, Leavitt Lake/Emigrant, Rogers Meadow and Hoover Lakes totaling 27,929 acres (see Table 8). Approximately 25,044 acres of those critical habitat acres consist of the primary constituent elements for the species. Primary Constituent Elements (PCEs) are habitat features that are required to sustain the species' life-history processes and are as follows for the Yosemite toad (USDI 2016)a:

(1) *Aquatic breeding habitat.*

(a) This habitat consists of bodies of fresh water, including wet meadows, slow-moving streams, shallow ponds, spring systems, and shallow areas of lakes, that:(i) Are typically (or become) inundated during snowmelt; (ii) Hold water for a minimum of 5 weeks, but more typically 7 to 8 weeks; and (iii) Contain sufficient food for tadpole development.

(b) During periods of drought or less than average rainfall, these breeding sites may not hold surface water long enough for individual Yosemite toads to complete metamorphosis, but they are still considered essential breeding habitat because they provide habitat in most years.

(2) *Upland areas.*

(a) This habitat consists of areas adjacent to or surrounding breeding habitat up to a distance of 1.25 km (0.78 mi) in most cases (that is, depending on surrounding landscape and dispersal barriers), including seeps, springheads, talus and boulders, and areas that provide: (i) Sufficient cover (including rodent burrows, logs, rocks, and other surface objects) to provide summer refugia,(ii) Foraging habitat,(iii) Adequate prey resources,(iv) Physical structure for predator avoidance,(v) Overwintering refugia for juvenile and adult Yosemite toads, (vi) Dispersal corridors between aquatic breeding habitats, (vii) Dispersal corridors between breeding habitats and areas of suitable summer and winter refugia and foraging habitat, and/or (viii) The natural hydrologic regime of aquatic habitats (the catchment). (b) These upland areas should also maintain sufficient water quality to provide for the various life stages of the Yosemite toad and its prey base.

Table 8. Acres of critical habitat for the Yosemite toad within the CIWMP project area.

Unit	Critical Habitat Unit (CHU)	Total critical habitat Unit acres	Critical habitat Unit acres within the project area	Unit acres within PCE's
1	Blue Lakes/Mokelumne	36,767	3,930	3,086
2	Leavitt Lake/Emigrant	76,066	18,115	16,451
3	Rogers Meadow	29,115	1,403	1,298
4	Hoover Lakes	5,681	4,481	4,209
	Total	**147,629**	**27,929**	**25,044**

Outside of critical habitat approximately 108,260 acres of 'suitable habitat' occur throughout the project area. Suitable habitat is defined as areas outside of critical habitat above 7,700 feet elevation that have unknown occupancy but include areas of potential breeding habitat buffered by .78 miles of upland habitat(see Figure 8).

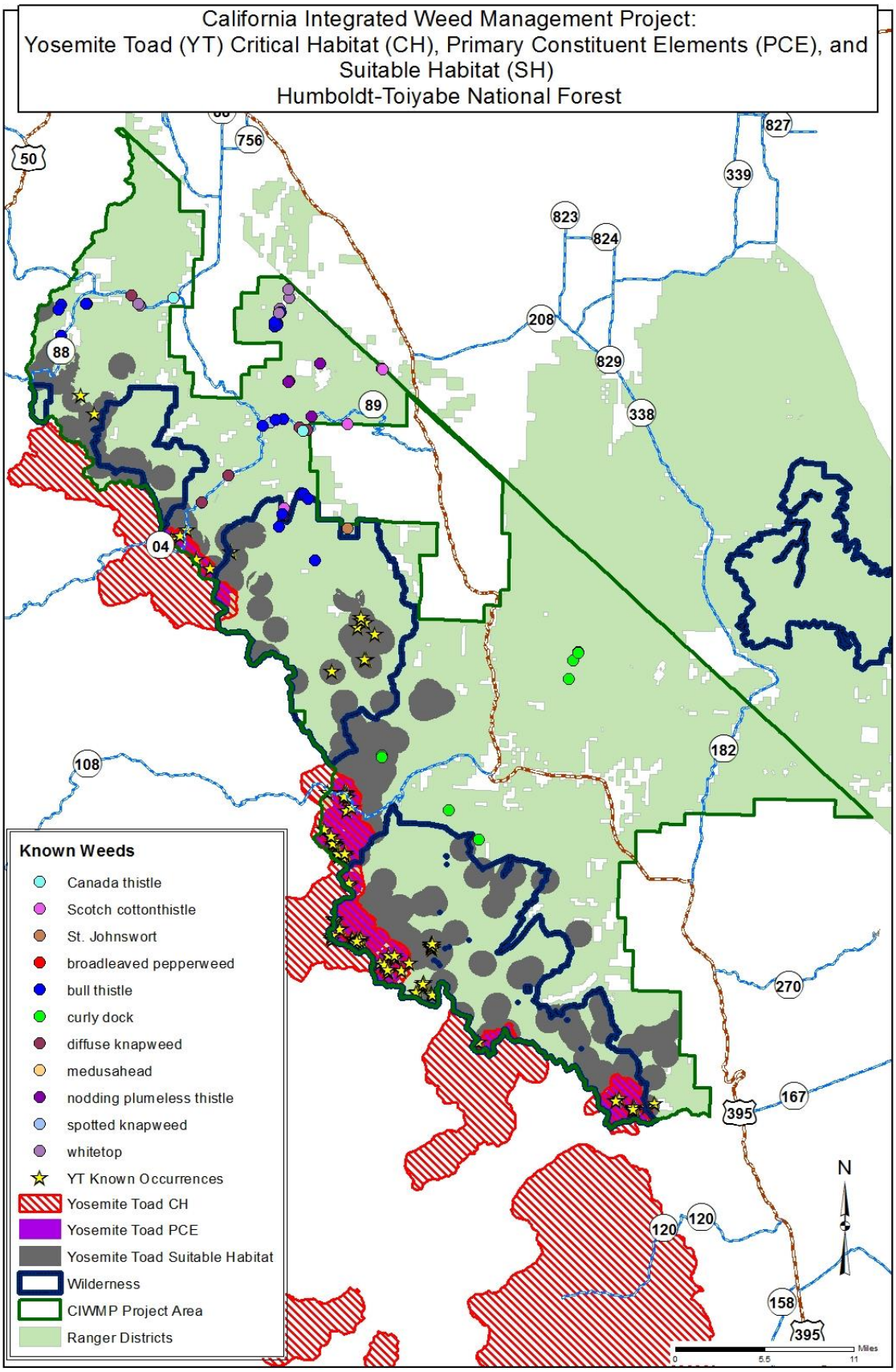
Threats: Yosemite toad declines have been attributed to cattle grazing, airborne chemical toxins, disease, and climatic shifts and variability (Davidson et al. 2002; USDI 2002). The USFS has specifically identified cattle grazing as an activity of concern for the conservation of Yosemite toads on National Forest lands in the Sierra Nevada (USDA2001). Various diseases have been confirmed in Yosemite toads including: Chytrid fungal infections of metamorphs and adults; saprolegnia fungal infections of eggs; iridovirus infection of larvae, metamorphs, or adults; and bacterial infections.

Current Noxious Weed Occurrences within Yosemite Toad Habitat within the CIWMP Area: Currently there are no known location of noxious weeds within any occupied or unoccupied critical habitat for Yosemite toad (Table 9). Outside of critical habitat, there is currently one small infestation (0.98 acres) of curly dock that occurs in unoccupied suitable habitat near the Wolf Creek drainage on the Bridgeport Ranger District.

Table 9. Noxious weed infestations within critical and suitable habitat for Yosemite toad in the CIWMP project area

Habitat Unit	Critical Habitat acres within Project area	Acres of noxious weeds within critical habitat	CHU Acres with PCE's	Acres of noxious weeds in PCE or suitable habitat	Weed Species	Treatment Method
Blue Lakes/Mokelumne	3,930	N/A	3,086	N/A	N/A	N/A
Leavitt Lake/Emigrant	18,115	N/A	16,451	N/A	N/A	N/A
Rogers Meadow	1,403	N/A	1,298	N/A	N/A	N/A
Hoover Lakes	4,481	N/A	4,209	N/A	N/A	N/A
Suitable Habitat (Wolf Crk-Bridgeport R.D.)	N/A	N/A	108,260	0.98	Curly dock	Hand pull if possible/clip and bag/herbicide wick and wipe

Figure 8: Habitat designations and distribution of the Yosemite toad within the California Integrated Weed Management project area.



B. TERRESTRIAL WILDLIFE

SIERRA NEVADA BIGHORN SHEEP (*Endangered*)

Range, Distribution, and Status: Sierra Nevada bighorn sheep (SNBS) herds were once scattered along and east of the alpine crest of the Sierra Nevada from the Sonora Pass area south to Olancha Peak and in similar habitat west of the Kern River as far south as Maggie Mountain (USDI 2007). Much of the historic habitat of the SNBS occurs on National Forest System lands within the Pacific Southwest Region (Inyo, Sequoia, Sierra, and Stanislaus National Forests) and the Intermountain Region (Humboldt-Toiyabe National Forest-Bridgeport Ranger District) (Ibid). The current populations primarily occupy the Inyo and Humboldt- Toiyabe National Forests (Bridgeport Ranger District), but some use also occurs in the Sequoia/Kings Canyon National Park, Yosemite National Park, and the Sierra National Forests.

Sierra Nevada bighorn sheep were listed as Endangered on January 3, 2000 (USDI 2000). Sixteen Recovery units for bighorn sheep were delineated in the Sierra Nevada Bighorn Sheep Recovery Plan (USDI 2007). The Bridgeport Ranger District includes the Northern Recovery Unit for SNBS which is comprised of four herd units (Mount Gibbs, Mount Warren, Green Creek, and Twin Lakes). Of these four units, only Mt. Warren, Green Creek, and Twin Lakes occur within the boundaries of the HTNF Bridgeport Ranger District and only Mt Warren was listed as "essential" for recovery in the 2007 Recovery Plan. In 2008, Critical habitat was designated for the species and included all units that were listed as essential for recovery, including Mt. Warren. (USDI 2008). The Twin Lakes and Green Creek herd units both contain suitable habitat and are expected to contain SNBS in the future, but neither are designated as critical habitat. Concurrent with the proposed designation of critical habitat for SNBS in 2007, the U.S. Fish and Wildlife Service also proposed a taxonomic revision to amend the final listing rule from a DPS of California bighorn sheep to subspecies *Ovis canadensis sierrae* (USDI 2007). The final rule to designate critical habitat and amend the taxonomic classification for Sierra Nevada bighorn sheep was published on August 5, 2008 (USDI 2008).

Habitat Requirements and Life History: The general habitat requirements of include open slopes where the terrain is rough, rocky, sparsely vegetated and characterized by steep slopes and canyons. Most SNBS sheep live between 10,000 and 14,000 feet in elevation in the summer and as low as 4,800 feet elevation in the winter. Bighorn sheep are primarily diurnal and daily activity can show some predictable patterns that consist of feeding and resting periods (USDA 2001). Nights are spent on rocky slopes, but feeding activities may occur short distances away from rocky escape terrain. This distance to escape terrain can be influenced by visual openness of vegetation or weather, wind, gender, season and abundance of predators.

As mentioned above, the project area includes designated critical habitat for SNBS. In determining critical habitat for a species, the FWS evaluates the availability of physical or biological features or "primary constituent elements" (PCEs) laid out in the appropriate quantity and spatial arrangement for the conservation of the species. The (PCEs) which make up the essential components of critical habitat for the SNBS include the following (USDI 2008):

1. Non-forested habitats or forest openings within the Sierra Nevada from 4,000 feet (1,219 m) to 14,500 feet (4,420 m) in elevation with steep (greater than or equal to 60 percent slope),

rocky slopes that provide for foraging, mating, lambing, predator avoidance, and bedding and allow for seasonal elevational movements between these areas.

2. Presence of a variety of forage plants as indicated by the presence of grasses (e.g., *Achnanthera* spp.; *Elymus* spp.) and browse (e.g., *Ribes* spp.; Artemisia spp., *Purshia* spp.) in winter, and grasses, browse, sedges (e.g., *Carex* spp.) and forbs (e.g., *Eriogonum* spp.) in summer.
3. Presence of granite rock outcroppings containing minerals such as sodium, calcium, iron, and phosphorus that could be used as salt licks/mineral licks in order to meet nutritional needs.

Male and female groups of bighorn utilize different habitat types throughout the year. Both sexes utilize the same winter ranges, but during the summer the two sexes move to different habitats. Females use alpine environments along the crest during the summer and males are often found at lower elevations in subalpine habitats. Males join the females during the breeding season in late fall (USDI 2007).

Sierra Nevada bighorn migrate attitudinally based on seasonal changes in resource availability, habitat and resource requirements (USDI 2008). Sierra Nevada bighorn sheep typically use low-elevation ranges in the winter and early spring, before migrating to alpine and subalpine ranges in summer and fall (Wehausen 1980). Sierra Bighorn sheep graze and browse on various plant species, but prefer green, succulent grasses and forbs. Their primary diet in winter is perennial needlegrass. In spring, their diet shifts to Mormon tea, bitterbrush and California buckwheat. This species forages in open habitats, such as meadows, sparse brush lands and rocky barrens (USDI 2007). Nevada bighorn sheep rarely utilize surface water; instead, these bighorn sheep generally obtain moisture from their forage or the occasional consumption of snow (USDI 2008).

Male and female bighorn sheep commonly live in separate groups during much of the year, and often occupy different habitats. In the Sierra Nevada, both sexes may share common winter ranges, but they show progressive segregation from winter to spring. During summer, the two sexes utilize different habitats, with females restricted largely to alpine environments along the crest and males often at somewhat lower elevations in subalpine habitats west of the crest. Males again join females during the breeding season in late fall. Breeding takes place in the fall, generally in November. Lambing occurs between late April to early July, with most lambs born in May or June (Wehausen 1996). Lambing areas are on safe, precipitous rocky slopes that are generally void of trees and thick brush to avoid predators. Lambs are precocious, and within a day or so, climb almost as well as the ewes. Lambs are able to eat vegetation within two weeks of their birth and are weaned between one and seven months of age. By their second spring, they are independent of their mothers.

Potential for Occurrence: Currently within the project area, SNBS are known to occur only within the Mount Warren herd unit. The Mount Warren Unit encompasses approximately 36,000 acres and includes both the HTNF and the Inyo National Forest. Approximately 4,239 acres of this unit occurs on the HTNF (project area) and is also designated as Critical habitat (USDI 2008). The Mt. Warren Unit ranges in elevation from about 7,500 feet to over 14,000 feet and is the northernmost unit designated as critical habitat for the Sierra Nevada bighorn sheep. Survey efforts in 2014 in the Mt. Warren Unit, located 21 bighorn in this herd: seven adult ewes, four yearling ewes, one yearling ram, three lambs, and six adult rams (CDFW 2014).

While the bulk of the SNBS sheep activity occurs primarily on the Inyo portion of the Unit, females appear to be utilizing the Bridgeport area more frequently than in the past, with several observations within the Virginia Creek and Dunderberg Peak area in the past few years.

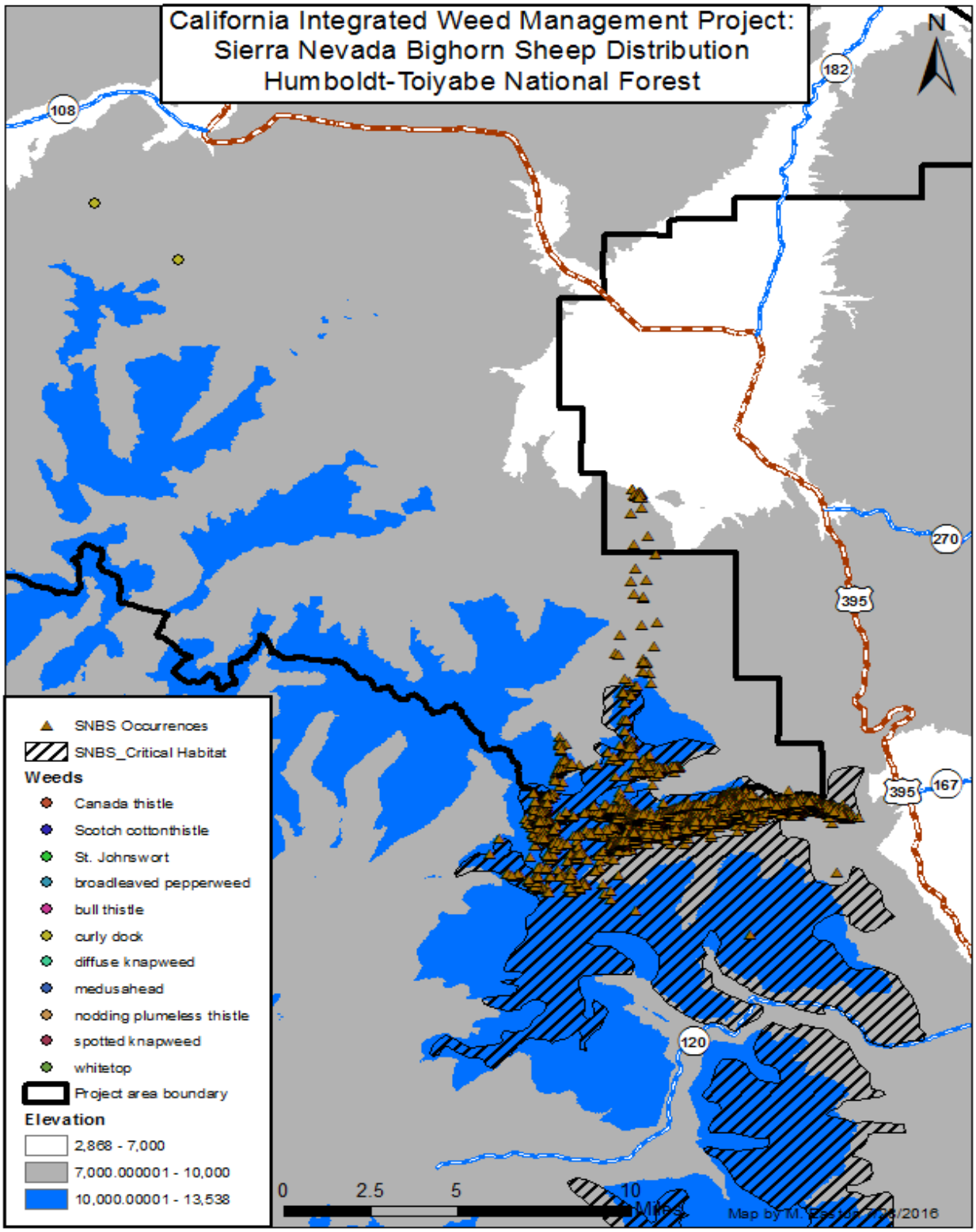
The Twin Lakes and Green Creek herd units are located within the project area but are currently not considered occupied. However occasional activity from SNBS in these units has been detected. In 2005, a radio-collared SNBS was recorded in the Green Creek area, but was considered a single occurrence by a foraying sheep from the Mt. Warren herd unit (Runcie, personal communication 2012). In November 2013, a GPS collared ewe, traveled north approximately six kilometers beyond the Mt. Warren herd unit boundary toward the Green Creek unit in a single day (CDFW 2014). She was observed in the same area in the winter of 2014 and was accompanied by other adult ewes and lambs (Ibid).

The high alpine and sub-alpine habitats of the Virginia Creek drainage, Dunderberg Peak, Kavanaugh Ridge, Monument Ridge and Green Creek drainage, offer suitable summer and winter habitat, as noted by the SNBS locations in these areas (Figure 9). There are large, rocky, open or wind-swept slopes which offer escape terrain from predators. The south-facing slopes also generally remain snow-free during the winter months, allowing SNBS to use this area during the winter. Although the Twin Lakes and Green Creek herd units were listed as not essential to SNBS recovery and that winter habitat was listed as limited within these areas, SNBS movements throughout this are during the winter demonstrate that there is in fact suitable winter range within these areas.

Threats: Disease transmission from domestic sheep or goats is considered to be one of the greatest threats to bighorn sheep. Disease transmission can kill large numbers of bighorn sheep with devastating consequences, particularly for smaller, isolated herds (Martin et al 1996).

Current Noxious Weed Occurrences in SNBS Habitat within the CIWMP Area: Currently there are no known occurrences of any noxious our invasive weeds that occur in occupied or unoccupied critical habitat for SNBS. Sierra Nevada bighorn sheep occur in sparsely vegetated plant communities located at high elevation areas (between 7,000 and 14,000 feet) that are typically not susceptible to noxious and invasive weed infestations. These environments tend to have low vegetation densities due to the granitic, rocky soil types, short growing season and other ecological factors. Noxious and invasive weeds rarely occur in these environments and then only occur typically as isolated individual plants rather than large homogenous infestations. In the Bridgeport area, currently there are no known or mapped locations of weeds above 8,000 feet occur in the Bridgeport area and only one mapped location occurs between 7,000 and 8,000 feet (curly dock) (See figure 9).

Figure 9. Distribution of Sierra Nevada bighorn sheep within the California Integrated Weed Management Project area.



NORTH AMERICAN WOLVERINE (*Proposed*)

Range, Distribution, and Status: Within the United States, wolverines are found within the high elevations of the northern Cascades of Washington, and northern Rockies in Montana, Wyoming, and Idaho. Historically, wolverines are thought to have occurred in most of the western mountain ranges. By the mid-1900s, however, the wolverine's range had been dramatically reduced due to high levels of trapping and low or non-existent immigration rates (Aubry et al 2007). Wolverines were extirpated from their historical range in California, Colorado, and Utah by 1930 (Ibid). The historic distribution of wolverines in California and the Sierra Nevada is poorly understood (Johnson 2010). The majority of information about this species in California comes from a collection of historical data gathered by Schempf and White (1977) who concluded the wolverine was once distributed throughout the State albeit in small numbers and mostly in the southern portion of the Sierra Nevada mountain range. Recent research has concluded that the historical wolverine population in California was genetically unique and highly isolated for millennia (Aubry et al 2007).

According to recent research conducted by the U.S. Forest Service Pacific Northwest and Rocky Mountain Research Stations, it is not conclusive that wolverines actually occurred in the Eastern Sierra (CIWMP area). Researchers found that previous distribution maps showing wolverines occurring throughout the Cascade Range and Sierra Nevada may not be accurate and that compelling evidence of their historical presence includes only Washington's northern Cascades and the southern Sierras in California (Aubry et al 2007). The nearest known resident population of wolverines occurs about 600 miles northeast of the Tahoe National Forest in Idaho's Sawtooth Range (USDA 2008).

In 2013, the North American wolverine was proposed for listing as Threatened under the Endangered Species Act (USDI 2016b). In 2014 the FWS withdrew its proposal after concluding that the factors affecting it were not as significant as were once thought. However, the District Court for the District of Montana overturned the Service's withdrawal, effectively returning the wolverine population to the point at which it was proposed for listing as threatened. A threatened listing would mean the wolverine population is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. The FWS is conducting a new review on the wolverine population to determine whether it meets the definition of a threatened or endangered species, or if the animal is warranted for listing at all USDI 2016b).

Habitat Requirements and Natural History: Wolverines were once thought to use a wide range of elevations and habitat types. However, new findings indicate that wolverines are restricted to alpine and sub-alpine communities for most of the year due to their need for persistent snow cover throughout the reproductive period (Aubry et al 2007). In addition, genetic analyses indicate that these areas also serve as the species' primary pathways for dispersal (Ibid). Wolverines generally have a home range of 38 to 347 square miles and may move great distances on a daily basis (Buskirk et al. 1994). Den sites are characterized by a large snag or down log component. Breeding occurs during June to August. Little information is known on den sites in forested areas. Wolverines are primarily scavengers and have specialized jaw structures and teeth that allows them to feed on large ungulates and other carrion, even when frozen. Wolverines also will feed on insects, berries, and fungi.

Potential for Occurrence: Wolverines do not occur in the project area and are no longer known to occur in California (USDI 2017, Aubry 2007). Only one Sierra Nevada record exists after

1930, indicating that this population was likely extirpated in the first half of the 1900s (USDI 2013). In 2008, a wolverine was detected on the Tahoe National Forest. This wolverine was determined to be a single animal that originated from the Rocky Mountains and is not thought to be indicative of a larger, local population (USDA 2008, USDI 2013). There is no evidence that California currently hosts a wolverine population or that female wolverines have made, or are likely to make, similar dispersal movements (USDI 2013). The nearest known resident population of wolverines occurs about 600 miles northeast of the Tahoe and Humboldt-Toiyabe National Forest in Idaho's Sawtooth Range (USDA 2008). Although there is a potential for wolverines to eventually recolonize in California, survey efforts for wolverines have been conducted for decades in the Sierra Nevada by state and federal agencies as well as research institutions with no detections (Kucera and Barrett 1993, IWS 2016, HTNF Carson Ranger District Forest Carnivore Surveys 1999-2016- *on file at the Carson Ranger District*).

Threats: Climate change is considered to be one of the largest threats to wolverines (USDI 2013). Climate change can affect wolverines directly through physiological stress, but also indirectly through changes to availability and distribution of wolverine habitat, including sub-alpine snow fields. Other threats include human use and disturbance, dispersed recreational activities, infrastructure development, transportation corridors, and land management (Ibid).

C. PLANTS

IVESIA WEBBERI (Threatened)

Status, Distribution, and Range: *Ivesia webberi* was listed as a threatened species on June 3, 2014 under the ESA (USDI 2014b-Federal Register 79:106 pp 31878-31883). *Ivesia webberi* is also a BLM sensitive species in Nevada and California, and is listed as Critically Endangered with the State of Nevada. Historically *Ivesia webberi* was known from 17 individual populations. Due to the extirpation of one population, the current distribution is documented from 16 known populations, occurring within three counties in California, Lassen, Plumas and Sierra and two counties in Nevada, Washoe and Douglas. (California) (USDI 2014b). The current overall population of *Ivesia webberi* is estimated at to be between 990,814 and 5,029,394 individuals although these estimates are considered unreliable due to the inconsistent survey methods conducted by observers (USDI 2014b).

On July 3, 2014, approximately 2,170 acres of critical habitat for *Ivesia webberi* was designated under the ESA (USDI 2014c-Federal Register 79:106 pp 32126-32144). In total, 16 Critical Habitat Units (CHU) were designated within Plumas, Lassen, and Sierra Counties in northeastern California, and in Washoe and Douglas Counties in northwestern Nevada.

***Habitat Requirements and Natural History*:** A general description of habitat requirements as well as the specific Primary Constituent Elements (PCEs) for *Ivesia webberi* are discussed below. Primary Constituent Elements are physical or biological features considered by FWS to be essential to the conservation of a listed species (USDI 2014c).

Ivesia webberi is a perennial herb in the rose family arising from a taproot. *Ivesia webberi* has yellow flowers and blooms from May to early June. The habitat for *Ivesia webberi* is restricted to low sagebrush (*Artemisia arbuscula*) dominated plant communities that occur in shallow, clay soils with a rocky pavement-like surface derived from andesitic rock types (Witham 2000).

Flowers open throughout the month of June, but individuals likely begin flowering in early May and some may produce flowers as late as the middle of July (Witham 2000). By late summer the plants are dried out, die back to the root caudex, and are difficult to locate (USDA 2009). Specific PCE's for *Ivesia webberi* include the following (USDI 2014b)

(i) Plant community: (a) Open to sparsely vegetated areas composed of generally short-statured associated plant species; **(b)** Presence of appropriate associated species that can include (but are not limited to): *Antennaria dimorpha, Artemisia arbuscula, Balsamorhizahookeri, Elymus elymoides, Erigeron bloomeri, Lewisia rediviva, Poa secunda,* and *Viola beckwithii;* **(c)** An intact assemblage of appropriate associated species to attract the floral visitors that may be acting as pollinators of *Ivesia webberi*.

(ii) Topography. Flats, benches, or terraces that are generally above or adjacent to large valleys. Occupied sites vary from slightly concave to slightly convex or gently sloped (0–15°) and occur on all aspects.

(iii) Elevation. Elevations between 4,475 and 6,237 ft (1,364 and 1,901 m).

(iv) Suitable soils and hydrology: (a) Vernally moist soils with an argillic horizon that shrink and swell upon drying and wetting; these soil conditions are characteristic of known *Ivesia webberi* populations and are likely important in the maintenance of the seedbank and population recruitment; **(b)** Suitable soils that can include (but are not limited to): Reno—a fine, smectitic, mesic Abruptic Xeric Argidurid; Xman—a clayey, smectitic, mesic, shallow Xeric Haplargids; Aldi—a clayey, smectitic, frigid Lithic Ultic Argixerolls; and Barshaad—a fine, smectitic, mesic Aridic Palexeroll.

Potential for Occurrence within the Project Area: The project area includes approximately 91 acres of occupied habitat for *Ivesia webberi* and approximately 582 acres of designated critical habitat. Occupied habitat on the Humboldt-Toiyabe National Forest (project area), occurs in four distinct populations all of which occur in the Dog Valley area of Sierra County, California (Table 10, Figure 10).

Table 10. Summary of current *Ivesia webberi* (*Ivesia webberi*) populations in Nevada and Calif. Highlighted rows indicate populations within the project area (Table was excerpted from *Species Report for Ivesia webberi* and was modified for the purposes of this analysis (*Ivesia webberi* USDI 2014d)

Population (USFWS)	Site Name	State	County	Population Estimate (range)	Est. Acres/Ha	Land Ownership	Threats***
1	Sierra Valley	CA	Plumas	50-10,000	44.8 (18.12)	BLM, Private, State	fgno
2	Constantia	CA	Lassen	100-999	1.91 (0.07)	BLM	f
3	East of HJWA, Evans Canyon	CA	Lassen	115-130	0.14 (0.06)	BLM	f
4	Hallelujah Junction WA	CA	Sierra	300-400	.05 (0.02	State	f
5	Dog Valley Meadow	CA	Sierra	100,000	71.58 (28.97)	USFS	fno
	Upper Dog Valley	CA	Sierra	5,000	0.99 (0.40)	USFS	fno

Population (USFWS)	Site Name	State	County	Population Estimate (range)	Est. Acres/Ha	Land Ownership	Threats***
6	White Lake Overlook	CA	Sierra	10,000	13.56 (5.49)	USFS	f
	Mules Ear Flat	CA	Sierra	<100	0.14 (0.06)	USFS	fno
	Three Pine Flat	NV	Washoe	1,000	1.13 (0.46)	Private	fno
	Halfway Slope	NV	Washoe	1,000	0.31 (0.13)	Private	dfno
7	Jeffrey Pine Saddle	NV	Washoe	1,000	0.42 (0.17)	Private	fno
8	Ivesia flat	NV	Washoe	100,000	0.73 (0.30)	USFS	fno
	Stateline Road 1a	NV	Washoe	1,000	7.03 (2.84)	USFS	dfn
9	Stateline Road 1b	NV	Washoe	50	0.01 (0.004)	USFS	dfo
10	Stateline Road 2	NV	Washoe	2,000	4.03 (1.63)	USFS	dfn
11	Hungry Valley	NV	Washoe	2,120	.016 (0.06)	BLM	fgno
12	Black Springs	NV	Washoe	>500 to 1,000	6.31 (2.55)	USFS	fno
13	Raleigh Heights	NV	Washoe	100,000 to 4,000,000	9.55 (3.86)	USFS	fno
14	Dutch Louie Flat	NV	Washoe	600,000 to 693,795	1.35 (0.55)	private	dfno
15	The Pines Powerline	NV	Washoe	63,300	0.14 (0.06)	private	dfno
16	Dante Mine Road	NV	Douglas	3,179– 36,500	0.56 (0.23)	BLM Private	dfno

***Threats = **d:** private/municipal development, **f:** wildfire and suppression activities, **g:** animal grazing/trampling, **n:** nonnative, invasive plant species, and **o:** OHV use and/or road corridors

Site #5-Dog Valley Meadow: The population in Dog Valley Meadow proper was estimated to be approximately 100,000 plants over approximately 72 acres. However, as mentioned above these numbers are not considered to be reliable and likely reflect overestimates of the true population in the meadow (USDI 2014d). The Dog Valley *Ivesia webberi* population occupies the same meadow as another rare plant species, Dog Valley ivesia (*Ivesia aperta canina*), which is endemic to this site and is considered a Forest Sensitive Species. The separation of habitat between the two species of *Ivesias* appears to be based on the more mesic habitat requirements for *Ivesia aperta canina*, and the adaptation to drier sites displayed by *Ivesia webberi*.

Site #5-Upper Dog Valley: This element occurrence was only discovered in 2009 during rare plant surveys conducted near Dog Valley Meadow. *Ivesia webberi* occupies approximately one acre situated on a gentle toe-slope on the eastern side of the valley. It was estimated that 5,000 plants are present. The site is typical of other element occurrences with a high amount of rocky pavement present and being characterized by clay soils. Dog Valley ivesia is also present within the upper reaches of the population and also to the north of the population within the general vicinity.

Site #6- White Lake Overlook: The White Lake Overlook population is estimated to contain approximately 10,000 individuals within a 13.56 acre area (USDI 2014d). However, similar to

the Dog Valley Meadow population, these numbers are likely overestimates of individuals and acres of occupied habitat (Ibid). This population is located in a vacant grazing allotment that has not been grazed in several decades.

Site#7-Mules Ear Flat- This population is located to the north of Dog Valley proper and is situated on the southern transition to Long Valley. The Mule's-Ear Flat population is estimated at less than 100 plants and occupies approximately 0.14 acres (Witham 1991). This population occurs in a vacant allotment that has not been grazed in several decades.

Threats: Threats to *Ivesia webberi* include urban development, roads, off- highway-vehicle use, livestock grazing and trampling (USDA 2009). Witham (2000) reported that several historic sites have been eliminated due to the development of subdivisions on the periphery of Reno, Nevada. In addition, populations have been impacted by recreational off highway vehicle disturbance, which can damage plants and promote the invasion of exotic species into the habitat of this rare species. Invasion of noxious and invasive weeds is considered to be one of the greatest threats to *Ivesia webberi* (Witham 2000, USDA 2009, USDI 2014b). According to the 2014 Species Report for *Ivesia webberi*, 12 of the 16 known populations currently have some level of infestation of non-native invasive plant species (USDI (2014d). In many of the *Ivesia webberi* populations, wildfire either within or adjacent to populations, created the disturbance to allow for the spread of invasive and noxious weeds to occur. Once established, these nonnative invasive plants have the potential to completely outcompete *Ivesia webberi* populations. In addition to displacing *Ivesia webberi*, the increased fuel loading associated with invasive grasses can result in the intensity of a wildfire being much greater than what would normally occur in these native plant habitat types. High intensity wildfire not only destroys individual *Ivesia* plants, but also denudes soils of nutrients and moisture resulting in a more conducive environment for invasive plant infestations. Currently, cheatgrass (*Bromus tectorum*), medusahead (*Taeniatherum caputmedusae*), and bulbous bluegrass (*Poa bulbosa*) are the most prominent non-native species located within and near *Ivesia webberi* populations (USDI 2014d).

Current Noxious Weed Occurrences in Webber Ivesia Habitat within the CIWMP Area:
Within the project area, noxious weeds, consisting of bull and musk thistle, are present in approximately 0.46% (2.5 acres) of designated critical habitat and within 0.08% (.07 acres) of occupied habitat (Table 11). Although these infestations are relatively small, weeds occurring outside of critical habitat also pose a potential future threat to Webber ivesia populations. Currently, approximately 8.7 acres of noxious weeds (musk thistle, bull thistle, and medusahead) occur within 500 feet of occupied and unoccupied critical habitat within the project area.

According to the 2009 Conservation Strategy and the 2014 Species Report for *Ivesia webberi* (USDA 2009, USDI 2014d), specific threats to the individual California populations include the following:

Dog Valley Meadow: Conifer encroachment and the increased presence of bulbous bluegrass which is a non-native and aggressively reproducing, weedy annual grass are the two primary threats to the Dog Valley Meadow population. Like cheatgrass and medusahead, bulbous bluegrass has invasive tendencies and has the potential to become a dominant species in the meadow. Primarily due to fire suppression, conifer seedlings from surrounding stands are also appearing in the meadow which as the potential to modify environmental conditions required by *Ivesia webberi*. In recent years, an increase in musk thistle (*Carduus nutans*) and bull thistle (*Cirsium vulgare*) has also occurred in and near occupied and unoccupied critical habitat near

Dog Valley Meadow. In addition to invasive species, areas near Dog Valley Meadow are also popular with recreationists from the Reno area for group events and other activities.

Upper Dog Valley: The primary threat to this population is off-road access which has been observed directly in the population. Forest System roads form a junction close to the site providing access to this area. The Forest Service is currently working to improve this site to protect the Ivesia population. Small individual populations of bull thistle occur on the periphery of critical habitat in this area.

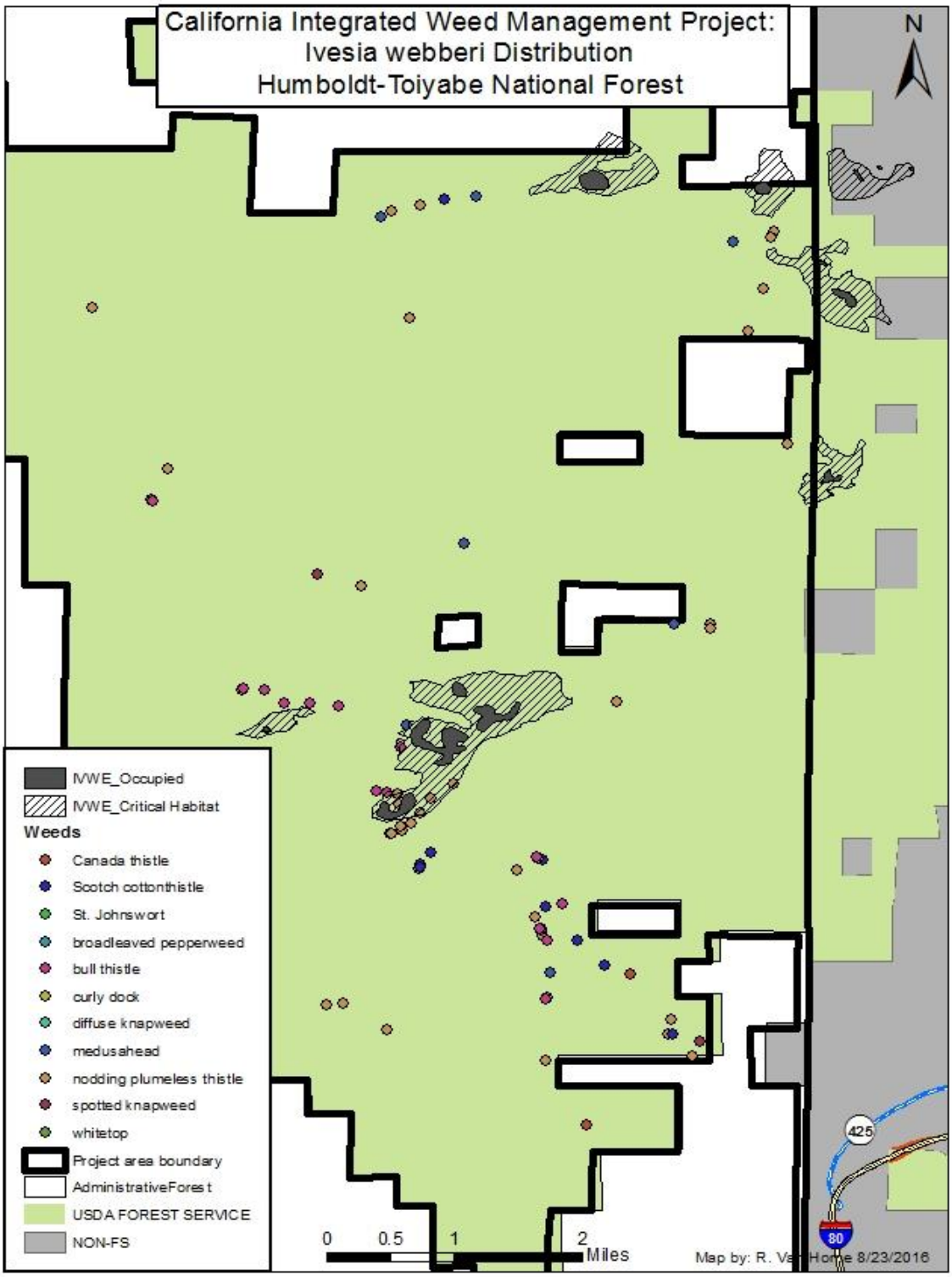
Mule Ear Flats and White lake Overlook: Cheatgrass occurs at varying levels within both populations. Medusahead is located within two miles of these populations and poses a potential future threat, particularly in the wake of a large disturbance such as wildfire. Off- highway recreation in this area is also a concern due to the number of roads that occur near the area. The relatively small size of the Mule Ear Flat population make it particularly vulnerable to stochastic events such as OHV incursion or invasive weed populations.

Table 11. Current acres of noxious weeds within unoccupied and occupied critical habitat for *Ivesia webberi* as well as noxious weeds within 500 feet of unoccupied and occupied habitat within the CIWMP area.

Weed species	Acres of Noxious Weeds within Unoccupied Critical Habitat	Percent of Unoccupied Critical Habitat with Weed Infestations*	Acres of Noxious Weeds Within 500' of Critical Habitat	Acres of Noxious Weeds in Occupied Habitat	Percent of Occupied Habitat with Weed Infestations**	Acres of Noxious Weeds within 500' of Occupied
Musk thistle	2.2	0.4%	5.8	.07	.08%	0.28
Bull thistle	0.35	0.06%	0.44	N/A	N/A	1.99
Medusahead	N/A	N/A	.09	N/A	N/A	0.09
TOTAL	**2.55**	**0.46%**	**6.33**	**.07**	**.08%**	**2.36**

*** Critical habitat for *Ivesia webberi* in the project area totals approximately 582 acres.**
**** Occupied habitat in the project area totals approximately 91 acres.**

Figure 10. Distribution of Ivesia webberi (*Ivesia webberi*) within the California Integrated Weed Management Project area.



The below effects analysis was conducted to evaluate potential effects to each species and their designated critical habitat (where applicable) from each of the project activities associated with the proposed action. The results of this analysis were used to develop a determination that is relative to each project activity associated with the proposed action. The following three categories are possible effects determinations:

- No effect
- May affect, but is not likely to adversely affect due to:
    - Beneficial effects
    - Discountable effects
    - Insignificant effects
- May affect, is likely to adversely affect.

These determinations are further defined in the FWS Endangered Species Consultation Handbook (USDI 1998), as summarized in the following text.

- No effect: Absolutely no effects to the species or its critical habitat, either positive or negative. A no effect determination does not include small effects or effects that are unlikely to occur. If effects are insignificant (in size) or discountable (extremely unlikely), a determination of "not likely to adversely affect" is appropriate.

- Not likely to adversely affect: All effects to the species or its critical habitat are beneficial, insignificant, or discountable. Beneficial effects have contemporaneous positive effects without adverse effects to the species. Insignificant effects relate to the size of the impact and should not reach the scale where take occurs. Discountable effects are considered extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur (USDI 1998).

- Likely to adversely affect: The action would have an adverse effect on the species or its critical habitat. Any action that would result in take of an endangered or threatened species is considered an adverse effect. A combination of beneficial and adverse effects is still considered "likely to adversely affect" even if the net effect is neutral or positive.

A. AQUATIC SPECIES (*Paiute cutthroat trout, Lahontan cutthroat trout, Sierra Nevada yellow-legged frog and Yosemite toad*).

Under the proposed action, several methods, including the use of herbicides, hand pulling, mechanical and prescribed burning, will be used to treat noxious and invasive weeds on National Forest System Lands that occur in California. When herbicides are used within and near aquatic habitats, they must contain a specific label that has been approved by the Federal Environmental Protection Agency (EPA) and the California Department of Pesticide Regulation (DPR) for aquatic use. These herbicides have different formulations than those used in upland plant communities and are considered safe to most aquatic organisms when label directions are followed. Only herbicides that have been approved for use in the state of California and have a label certifying that the chemical has been approved for use by the EPA and the DPR, would be

used in the California Integrated Weed Management Program. Label directions, as well as all laws and regulations governing the use of pesticides, as required by the U.S. Environmental Protection Agency, the California Department of Pesticide Regulation, and Forest Service policy pertaining to pesticide use, would be followed. Coordination with the appropriate County Agricultural Commissioners would occur, and all required licenses and permits would be obtained prior to any pesticide application.

Off-target drift and movement of chemicals through soils can occur when using herbicides. Drift is the movement of any herbicide through the air to areas not intended for treatment. Drift includes volatilization, where some herbicides may be rapidly lost as vapors after application. Drift depends on droplet size, wind speed and direction, height above ground of the application, herbicide formulations and ambient temperature.

Where herbicide treatments are proposed, the lowest effective label rates would be used. In occupied and critical habitat for threated and endangered aquatic species all herbicides would be applied by hand through direct foliar spray and/or wiping methods. Applying these targeted techniques, as well as incorporating other design features such as monitoring wind speeds and setting low nozzle heights, will greatly reduce the potential for inadvertent drift of herbicide.

Movement of chemicals on soil through surface runoff and leaching can be a concern when using herbicides in sensitive environments. *Surface runoff* is when water moves over the surface of a field or treated area that can carry herbicide with it. *Leaching* occurs when water carries herbicides into and ultimately out of the root zone. The portion lost to leaching depends on soil texture, herbicide solubility, and amount and intensity of rainfall. The greatest loss of herbicide in both runoff and leaching occurs when the herbicide is applied directly to the soil surface. As mentioned above, this broad scale application technique will not be used in occupied or critical habitat for threatened and endangered aquatic species. All herbicide treatments conducted in rare aquatic species habitat will be conducted by hand either through direct foliar spray o and/or wicking and wiping of individual plants. Using these application techniques, herbicide residue on soil surfaces will be minimal and will result in no measureable impacts to aquatic species.

When working with herbicides there is a remote risk of accidental spills or other exposure scenarios other than those described above. To limit the potential for herbicide spills impacting threatened and endangered aquatic species, mixing and loading of herbicides would not occur in or near any occupied habitat for these species. Mixing will occur only on level, disturbed sites off of roadways, such as the interior of landings, and water drafting from aquatic features would not occur. An additional exposure scenario that could affect aquatic species is accidental equipment malfunction when treating invasive plant infestations near occupied locations. Project design features requiring regular inspection and tests of all equipment used for herbicide application would greatly reduce the risk of herbicides spills when working in these sensitive areas. In addition, a small spill containment kit would be carried by herbicide applicators when wicking and wiping to further limit potential effects in the event of equipment failure.

In addition to the EPA and the DPR, the Forest Service also relies on Human Health and Ecological Risk Assessment reports prepared by Syracuse Environmental Research Associates (SERA) to determine appropriate use of herbicides in particular environments. These reports utilize the best available science to describe the level of herbicide expected to be introduced, persist, and transport within plant communities, and to evaluate the likelihood of subsequent adverse ecological effects. These assessments use peer-reviewed articles from the open scientific literature and current EPA documents. The likelihood that an animal will experience adverse effects from an herbicide depends on: (1) toxicity of the chemical, (2) the amount of chemical to

which an animal is exposed, (3) the amount of chemical actually received by the animal (dose), and (4) the inherent sensitivity of the animal to the chemical, all of which are evaluated in FS/SERA risk assessments.

The following includes a summary of the SERA toxicity assessments of herbicides proposed for use in this project: *Glyphosate (aquatic formulation), Triclopyr, Aminopyralid, Chlorsulfuron, Imazapyr, Sulfometuron-methyl* (SERA 2011a, 2011c, 2007, 2004a, 2011b, 2004b) *and Rimsulfuron* (USDI 2014e). While the assessments do not specifically address affects to the four species analyzed in this BA, they do address affects relative to fish and amphibians and therefore are relative to this analysis.

Glyphosate (aquatic formulation)

Within the California IWMP, only the aquatic formulation of glyphosate (Rodeo) may be used within 10ft of perennial rivers, streams, lakes, seasonal flooded SEZs, and wet meadows. Glyphosate itself is of moderate toxicity to fish. The 96-hour LC50 of technical grade glyphosate for bluegill sunfish and rainbow trout are 120 mg/L and 86 mg/L, respectively. Fish exposed to 5 mg/L of glyphosate for two weeks were found to have gill damage and liver damage was observed at glyphosate concentrations of 10 mg/L (Neskovic et al. 1996). The technical grade of glyphosate is of moderate toxicity to aquatic species, and the toxicity of different glyphosate formulations can vary considerably.

The surfactant in Roundup® formulations (non-aquatic) can be toxic to fish and larval amphibians. Rodeo® has no surfactant, and is registered for aquatic use. The surfactant X-77 Spreader®, which is often used in conjunction with Rodeo®, is approximately 100 times more toxic to aquatic invertebrates than Rodeo® alone (Henry et al. 1994). It appears that under most conditions, rapid dissipation from aquatic environments of even the most toxic glyphosate formulations prevents build-up of herbicide concentrations that would be lethal to most aquatic species. The surfactants in the toxic forms of glyphosate are much more toxic than the glyphosate to aquatic organisms (SERA 2011a), so it is assumed that with the use of an aquatic formulation, a less toxic surfactant may be chosen. Relyea and Jones (2009) found that the proposed application rate of 1.5 mg/L is well within the range of LC50 dosages for amphibian species. Trumbo (2005) found a 96-hour LC50 value for glyphosate without surfactant (i.e. Rodeo®) on larval northern leopard frog (*Rana pipiens*) to be 6.5 mg/L (using the EPA uncertainty factor NOEC= 1.3 mg/L). When taking into account the uncertainty factor, the proposed estimated maximum concentrations of aquatic glyphosate, may produce some risk to sublethal effects.

Chronic effects resulting from sublethal concentrations of some glyphosate-based herbicides (GBH) bear the potential to disrupt larval development. Also natural stressors such as competition or dry-out of ponds can lead to differences in body mass at metamorphosis and time to metamorphosis. An evaluation of long-term effects, however, is difficult since specific studies on natural amphibian populations or life-cycle tests have not been conducted. Based on the results of some studies, the EPA (U.S. EPA 2012) calculated ecotoxicological endpoints (NOEC, LOEC) for chronic effects of glyphosate-based herbicides on amphibians. A comparison of these studies is hardly possible because they differ in design and the sublethal effects investigated. None of the studies addressing acute effects referred to chronic effects. Direct overspray of individuals with some GBH can pose direct health effects while other GBH apparently do not cause any acute effect with recommended application rates. Furthermore, effects are species-

dependent. Standard procedures for direct over-spray of individuals or just their skin (Quaranta et al. 2009) enable assessing the risk of dermal uptake during terrestrial life-stages.

Triclopyr

Within the California IWMP, triclopyr will not be applied within 50ft of perennial rivers, streams, lakes, wet meadows, and other water bodies, including seasonally flooded Stream Environment Zones (SEZs). Triclopyr is generally used to treat woody species such as saltcedar tamarix (*Tamarix ramossissima*) which is not a priority species for treatment on the HTNF. Application of triclopyr is always cut stump with direct foliar spray and/or wiping. Triclopyr has rarely been used on the HTNF.

The salt formulation of triclopyr (TEA) is slightly toxic to fish and aquatic invertebrates. The LC50 of the salt formulation for rainbow trout is 552 mg/L and for bluegill sunfish is 891 mg/L. The water-soluble salt is degraded in the water column through photolysis and hydrolysis (McCall & Gavit 1985). Movement of triclopyr through surface and subsurface runoff in areas with minimal rainfall is believed to be negligible (Newton et al. 1990; Stephenson et al. 1990). In southwest Oregon, Norris et al. (1987) found that neither leaching nor long-distance overland water flow contributed significant amounts of the herbicide into a nearby stream, and concluded that the use of triclopyr posed little risk for non-target organisms or downstream water users. Triclopyr BEE is much more toxic to aquatic species than triclopyr TEA or triclopyr acid (SERA 2011b). Triclopyr was specifically tested for ability to cause malformations in the frog embryo teratogenesis assay using African clawed frogs (*Xenopus laevis)* (Perkins 2000). Xenopus is a highly sensitive assay species for determining the teratogenicity of chemicals (Perkins et al. 2000). No statistically significant increase in abnormalities were seen in any groups exposed to Garlon 3A or Garlon 4 at levels that were not also lethal to the embryos. Consistent with results for other aquatic species, Garlon 3A, containing triclopyr TEA, was 15 times less toxic than Garlon 4, containing triclopyr BEE. Garlon 4 reduced embryo growth at a concentration below the LC50. Perkins et al. (2000) found that the 96-hour LC50 for Garlon 4 was 10 mg acid equivalent (a.e.)/L, and that for Garlon 3A was 159 mg a.e./L. Perkins (2000) calculated that if Garlon 4 was applied at the highest application rate directly to water 15 cm deep (volume not specified), the expected environmental contamination was less than the LC50 and the LC5 by a factor of about four and three, respectively. Berrill et al. (1994) conducted toxicity studies on eggs and tadpoles of leopard frog (*Rana pepiens*), green frog (*Rana clamitans*), and bullfrog (*Rana catesbeiana*) exposed to technical grade triclopyr BEE. The study was conducted in darkness to prevent hydrolysis of triclopyr BEE to triclopyr acid. Exposure of eggs to concentrations up to 4.6 ppm triclopyr a.e. for 48 hours caused no effect on hatching success, timing, malformations, or subsequent avoidance behavior of tadpoles hatched from exposed eggs (Berrill et al. 1994). Tadpoles were more sensitive; all bullfrog and green frog tadpoles exposed to 2.3 and 4.6 ppm triclopyr a.e. died. Leopard frogs were more tolerant and few died, but all were unresponsive to prodding at 2.3 and 4.6 ppm a.e. About half the bullfrog and most green frog tadpoles became unresponsive to prodding when exposed to 1.1 ppm a.e. Surviving tadpoles recovered after exposure was terminated.

Aminopyralid

Within the California IWMP, aminopyralid may be used within 10ft of perennial rivers, streams, lakes, seasonal flooded SEZs, and wet meadows. Results of the aminopyralid risk assessment analysis (SERA 2007) conclude that sensitive fish species exposed to the proposed maximum application rate have an extremely small potential to receive doses that are above the toxicity index. The EPA Pesticide Fact Sheet for aminopyralid (U.S. EPA 2005) states that it has been

shown to be practically non-toxic to fish and is not expected to bio-accumulate in fish tissue. This same fact sheet gives a 96 hour LC50 aminopyralid dosage of 100 mg/L (using the EPA uncertainty factor NOEC= 20 mg/L) for rainbow trout and a NOEC of 1.3 mg/L for young fathead minnows (*Pimephales promelas*). Results of the aminopyralid risk assessment analysis (SERA 2007) conclude that sensitive amphibian species exposed to the proposed concentrations have an extremely small potential to receive doses that are above the toxicity index (HQ=0.002, Appendix B, Table 6). The EPA Pesticide Fact Sheet for aminopyralid (U.S. EPA 2005a) gives a 96-hour LC50 dosage of 95 mg/L (using the EPA uncertainty factor NOEC= 19 mg/L) for northern leopard frog (*Rana pipiens*).

Chlorsulfuron

Within the California IWMP, chlorsulfuron will not be applied within 50ft of perennial rivers, streams, lakes, wet meadows, and other water bodies, including seasonally flooded Stream Environment Zones (SEZs). Results of the chlorsulfuron risk assessment analysis (SERA 2004a) conclude that sensitive fish species exposed to the proposed concentrations have an extremely small potential to receive doses that are above the toxicity index. The EPA Pesticide Fact Sheet for chlorsulfuron (U.S. EPA 2005b) states that it is practically non-toxic to fish on an acute exposure basis. Kegley et al. (2009) found in brown trout (*Salmo trutta*) a 96 hour LC50 dosage of 39 mg/L (using the EPA uncertainty factor NOEC= 7.8 mg/L). The SERA risk assessment for Chlorsulfuron does not include toxicity assessments for amphibians, and no information on toxicity information on amphibians was identified in a review of literature.

Imazapyr

Within the California IWMP, Imazapyr may be used within 10ft of perennial rivers, streams, lakes, seasonal flooded SEZs, and wet meadows and will be used within 50ft of LCT and PCT habitat. Imazapyr is of low toxicity to fish and invertebrates. The LC50s for rainbow trout, bluegill sunfish, channel catfish, and the water flea (*Daphnia magna)* are all >100 mg/L.

As of September 2003, imazapyr (tradename Habitat®) is registered for use in aquatic areas. Despite its potential mobility, imazapyr has not been reported in water runoff, and we found no reports of imazapyr contamination in water. If it enters the water column, imazapyr can be photodegraded by sunlight with an average half-life of two days (Mallipudi et al. 1991).

Sulfometuron-methyl

Within the California IWMP, sulfometuron-methyl will not be applied within 50ft of perennial rivers, streams, lakes, wet meadows, and other water bodies, including seasonally flooded Stream Environment Zones (SEZs). As mentioned in the proposed action, the HTNF will be replacing sulfometuron-methyl with rimsulfuron, once the Pesticide Use Proposal for rimsulfuron is completed,

The compound is slightly toxic to freshwater fish. Its LC50 in rainbow trout and bluegill sunfish is greater than 12.5 mg/L. While the compound may not present a significant threat to adult aquatic organisms, the embryo hatch stage of fathead minnow may be at particular risk from the presence of the compound at a low concertation of 0.71 mg/L. No bioaccumulation was noted in a test with bluegill fish when exposed for 28 days at 1 mg/l. The compound was not detected in the muscle nor the viscera of the fish. In well aerated acidic water, the compound is broken down relatively quickly with a half-life of about 10 days. In more alkaline water, half of the initial amount of the compound was lost within 8 months. This indicates that acidity plays an important

role in the degradation of the compound. Under non-oxygenated conditions in water sediments the compound had a half-life of several months. The compound is only slightly soluble in water; however, its solubility increases with increasing alkalinity. The compound has the potential to be transported by run-off water during intense storms soon after field application (EXTONET 1994)

The effect of sulfometuron-methyl to amphibians was investigated in one study using African clawed frogs (SERA 2004). Results of the study found that sulfometuron-methyl exposure can cause moderately severe malformations in these frogs, including miscoiling of the gut, incomplete eye lens formation, abnormal craniofacial development, and decreased tail resorption. The concentration that produced these effects depended upon the length of exposure, with shorter exposures showing no effect at higher concentrations than longer exposures. The author did not state whether data were reported in terms of mg of sulfometuron-methyl or mg of Oust. The FS/SERA risk assessment assumes that data refer to mg of Oust, to provide the most protection. The NOAEC for malformations for 4- hour exposure is 0.38 mg active ingredient/liter (a.i./l), and that for 30-day exposure is 0.0075. However, exposure to 0.0075 mg a.i./L for 14 days was identified as the LOAEC for tail resorption rate effects. No mortality was observed at concentrations up to 7.5 mg a.i./L.

Rimsulfuron

Within the California IWMP, rimsulfuron will not be applied within 50ft of perennial rivers, streams, lakes, wet meadows, and other water bodies, including seasonally flooded Stream Environment Zones (SEZs). Rimsulfuron is an effective herbicide in the treatment of annual grasses and is preferable over Sulfometuron-methyl due to its relative stability in soils and overall better environmental characteristics. The Forest Service is in the process of developing a Pesticide Use Proposal for rimsulfuron. Once a USFS Pesticide Use Proposal is completed, the HTNF will no longer use sulfometuron-methyl and will replace it with rimsulfuron for the treatment of annual grasses.

The toxicity of Rimsulfuron to freshwater fish was evaluated by testing both coldwater and warmwater fish species, and the lowest toxicity result was selected as the TRV for fish. One study examined the acute toxic effects of Rimsulfuron on rainbow trout (*Oncorhynchus mykiss*), a coldwater species. This study found that no adverse effects occurred after 96 hours of exposure to 390 mg/liter (MRID 41356307). The LC50 from this study was determined to be in excess of 390 mg/L. Acute toxicity tests were also conducted with warm-water fish species, namely the bluegill sunfish (*Lepomis macrochirus*). Two studies determined that no adverse effects occurred after 96 hours of exposure to 390 mg/L. The LC50s from these studies were also in excess of 390 mg/L (MRIDs 41356308, 41931620). These results suggest that cold-water and warm-water fish species may have comparable sensitivity to Rimsulfuron. No chronic tests were identified.

A-1. SPECIFIC DIRECT AND INDIRECT EFFECTS TO INDIVIDUAL AQUATIC SPECIES:

PAIUTE CUTTHROAT TROUT

Under the Proposed Action, project activities may have some minor and short term effects to PCT from disturbance associated with treatment activities. Currently there are no known noxious weeds within 300 feet of any PCT occupied streams (see Table 4, Figure 5).

The following design features were incorporated into the proposed action to minimize effects to Paiute cutthroat trout from project activities:

- (DF#37) When in proximity to Lahontan and Paiute cutthroat trout habitat, every effort will be made to treat weeds by manual methods. If it is determined the use of herbicides is the only practical method to treat weed infestations in these areas, only dip & clip and/or wicking & wiping applications of glyphosate or imazapyr will be used within 50 feet from occupied Lahontan and Paiute cutthroat trout habitat.
- (DF#38)Tarping and mulching will not be used within occupied Lahontan and Paiute cutthroat trout habitat. While these methods can be effective in controlling noxious weeds, they are not feasible to implement and maintain in remote riparian settings.
- (DF#39) Mechanical, biological control, and prescribed burn treatments will not occur within Paiute cutthroat trout occupied habitat due to the minimal weed infestations associated with their high alpine habitat and the logistical challenges associated with using these treatment methods in the wilderness (where Paiute cutthroat trout occur).

Direct and Indirect Effects of Individual Treatment Methods:

Manual- Within the project area, PCT and PCT habitat occurs only within the Carson Iceberg Wilderness. Within wilderness areas, treatment methods for noxious weeds will almost always be limited to manual methods and will include hand pulling, digging, clipping and bagging techniques only. These methods will have no measurable effect on PCT or their habitat. Although some minor ground disturbance may be associated with hand pulling or digging, this disturbance would be minimal and would not lead to any negative direct or indirect effects to PCT. The presence of weed treatment crews working in riparian areas may inadvertently flush PCT from pools or eddies. However, this disturbance would consist of a crew of two hand pulling weeds for no more than half a day and only last while crews were working in the area Furthermore, weed treatments in the Carson Iceberg Wilderness would not be conducted until June and July at the earliest and therefore would avoid potential disturbance to PCT during their spawning period which generally occurs during the spring (April and May). Other hand methods including tarping and mulching will not be used in PCT habitat.

Herbicide-A detailed discussion of the herbicides proposed and their potential effects to aquatic species is provided at the beginning of this Section (Section IX). As mentioned above, every effort will be made to treat noxious weeds by hand within habitat for PCT. If herbicides are used, only dip & clip and/or wicking & wiping applications of aquatic formulation of Glyphosate or Imazapyr will be used within 50ft of occupied habitat. These methods are considered 'direct application' because they are applied directly to the plant minimizing any potential inadvertent drift to non-target species. The highest concentration of the active ingredient proposed for use (according to label direction) for these chemicals is well below the LC50's for fish for any of the chemicals (Appendix A). Because any herbicides used within 50feet of PCT habitat will be applied directly to individual plants, there is minimal chance for accidental drift and thus

bioaccumulation of these chemicals in the soil or water. There would be no measurable direct impacts to PCT populations due to the presence of treatment crews and their treatment equipment (clippers, shovels, etc).

Mechanical, Biological control and prescribed burn- Under the Proposed Action, mechanical, biological control, and prescribed burn treatments will not occur within PCT occupied habitat due to the minimal weed infestations associated with PCT habitat and the logistical challenges associated with using these treatment methods in the wilderness (where PCT occur).

Cumulative Effects

In 2013, non-native fish were removed from Silver King Creek from Llewellyn Falls to Silver King Canyon. Rotenone chemical treatments were conducted once a year over a three year period and concluded in 2015. All non-native fish have now been removed from the native range of the Paiute cutthroat trout and Paiute cutthroat trout are beginning to repopulate their historic habitat by natural downstream drift. In 2017, Paiute cutthroat trout will be reintroduced into their historic range between Llewellyn Falls and Silver King Canyon, extending their existing habitat in the Carson-Iceberg by approximately 11 miles. The actions proposed for this project will have no measureable negative cumulative effects on PCT. However, over the long term, the removal of non-native plants from riparian native plant communities will help maintain and preserve important habitat characteristics for PCT.

Determination

Based on the above analysis it is determined that two treatment methods associated with the California Integrated Weed Management Project, manual treatments and herbicide use, **may affect but are not likely to adversely affect the Paiute cutthroat trout.** This determination is based on:

- **Currently no noxious weeds occur within 300 feet of occupied habitat for Paiute cutthroat trout. Future weed treatments within habitat for the Paiute cutthroat trout will consist primarily of manual methods only. Manual treatments, though limited generally to individual occurrences of noxious weeds, may still cause some disturbance to PCT during treatment activities**. **Any negative effects from disturbance will be temporary and short term.**

- **The use of herbicides poses a minor risk to Paiute cutthroat trout. If herbicides are needed, only aquatic formulations will be used within 50 feet of an occupied stream for PCT. Using the direct application method and following all appropriate BMPs and label directions will minimize the ability for chemicals to runoff or enter the stream environment and potentially cause negative effects to the Paiute cutthroat trout**.

The remaining activities associated with the California Integrated Weed Management Project, including **mowing, mulching, tarping, biological controls and prescribed burning** will have **no effect** on the Paiute cutthroat trout because:

- **The above listed activities will not occur within habitat for the species and therefore will have no direct, indirect or cumulative effect on Paiute cutthroat trout.**

LAHONTAN CUTTHROAT TROUT

Under the Proposed Action, project activities may have some minor and short term effects to LCT from disturbance associated with treatment activities. Within the project area, there are currently three mapped weed infestations, totaling approximately 3.3 acres, within 300 feet of an occupied stream or river for LCT (see Table 5, Figure 6). Two of the infestations are located on the Carson Ranger District in Alpine County, CA and the third is located on the Bridgeport Ranger District in Mono County, CA. The Carson Ranger District infestations both occur near the West Fork of the Carson River in the Woodford's Canyon area and include a .09 acre patch of diffuse knapweed and a 3.19 acre infestation of perennial pepperweed. On the Bridgeport Ranger District, a small infestation (.098 acres) of curly dock occurs near the Wolf Creek drainage. Treatment strategy for the small population of diffuse knapweed would include hand-pulling only. Hand pulling is an effective treatment strategy for small populations of biennial and annual plants such as knapweeds as they are shallow-rooted and can be easily pulled. Perennial pepperweed and curly dock, however, are both long tap rooted perennials that can be difficult to hand pull effectively, particularly when there is more than just a few individual plants. Therefore, herbicides would be the likely method used to treat these infestations.

The following design features were incorporated into the proposed action to minimize effects to Lahontan cutthroat trout from project activities:

- (DF#37)When in proximity to Lahontan and Paiute cutthroat trout habitat, every effort will be made to treat weeds by manual methods. If it is determined the use of herbicides is the only practical method to treat weed infestations in these areas, only dip & clip and/or wicking & wiping applications of glyphosate or imazapyr will be used within 50 feet from occupied Lahontan and Paiute cutthroat trout habitat.
- (DF #38)Tarping and mulching will not be used within occupied LCT and/or PCT habitat. While these methods can be effective in controlling noxious weeds, they are not feasible to implement and maintain in remote riparian settings.
- (DF#40) Prescribed burning will not occur within 300 feet of occupied habitat for LCT to eliminate the potential for inadvertent disturbance from burning operations to LCT and LCT habitat.
- (DF#41) To minimize negative impacts to Lahontan cutthroat trout (LCT), mechanical methods such as mowing and targeted grazing will not be permitted within 50 feet of an occupied LCT stream channel. This buffer will minimize the potential for any mowed clippings to enter the waterway and eliminate the potential for bank disturbance and erosion from mowing and/or targeted grazing.

Direct and Indirect Effects of Individual Treatment Methods:

Manual- As stated in design feature #37, weed treatment conducted by hand, including pulling, digging, clipping and bagging, will be the preferred method of treatment in occupied LCT habitat. Hand pulling methods will have no measurable effect on LCT or their habitat. Although some minor ground disturbance may be associated with hand pulling or digging, this disturbance would be minimal and would not lead to any negative direct or indirect effects to LCT. The presence of weed treatment crews working in riparian areas may inadvertently flush LCT from pools or eddies. However, this disturbance would consist of a crew of two hand pulling weeds for no more than half a day and only last while crews were working in the area. Because only small patches of individual plants would be removed by digging or pulling, ground disturbance

would be minimal and would not result in any measurable increase in erosion or sediment entering the waterway.

Other manual methods, including tarping and mulching, will not be used within LCT occupied habitat. While these methods can be effective in controlling noxious weeds, they are not feasible to implement and maintain in remote riparian settings.

Mechanical- The need for mechanical treatments (i.e. mowing) is expected to be minimal within LCT habitat. Mowing is generally only used to treat expansive monocultures of noxious and invasive weeds which currently do not exist in areas where LCT are present. However, some of the more xeric riparian corridors associated with LCT could be susceptible to invasives, particularly cheatgrass, following a large disturbance such as a wildfire. Mowing could potentially be an effective tool in this situation in reducing cheatgrass populations. If in the future mowing is determined to be necessary, effects to LCT and LCT habitat would be minimal. Under the proposed action, all mowing activities would be kept at least 50 feet away from the stream channel. This buffer will reduce the risk of erosion and increased sediment from mowing activities. In addition, mowing would include the use of a small (700lb) bobcat-type loader equipped with rubber tracks to minimize ground disturbance. Clippings from the mowing operations would produce minimal levels of biomass and would therefore be retained on the ground. The 50 foot treatment buffer and minimal amount of resulting biomass would minimize the risk of clippings entering the waterway.

Biological control- Biological controls (both targeted grazing and insects) are generally used only when large infestations have become well established and other control methods are not feasible. Both targeted grazing and insects have been used on the Carson Ranger District (Nevada) to effectively treat a variety of noxious weeds including, perennial pepperweed, Canada thistle, and spotted knapweed.

Targeted grazing: Under the Proposed Action, the use of livestock to control noxious and invasive weeds are only used under specific "targeted grazing" conditions. In targeted grazing, the kind of animals and amount and duration of grazing are specifically designed to help control a particular species of plant while minimizing the impacts on perennial native vegetation that is needed to help reduce the likelihood of reinvasion by undesirable plant species. Targeted grazing includes the use of goats, sheep, or other livestock that have been specifically 'trained' by their operators to eat certain plant species. Generally the operator also uses a portable fencing system to help 'target' the animals on focal species. When managed properly, it has been demonstrated that the use of sheep and goats to manage invasive species such through targeted grazing has improved the conditions of native plant communities by creating spaces within previously infested sites for native grass and forb growth. Although targeted grazing is an effective tool in suppressing noxious weed populations, the use of livestock inherently results in some level of ground disturbance and consumption of native plant material as well as non-native plants. To minimize potential negative impacts to LCT such as streambank erosion and/or consumption of native riparian vegetation, targeted grazing will not be permitted within 50 feet of an occupied LCT stream channel. Weeds in these areas would be treated using other methods such as hand pulling and digging.

Insects: Plant-eating insects, nematodes, or mites affect plants directly, by destroying vital plant tissues and functions, and indirectly, by increasing stress on the plant, which may reduce

its ability to compete with other plants. Within the CIWMP area, it is anticipated the use of insects as biological weed control in LCT habitat will be rare. Insects are generally only used to control expansive, contiguous monocultures of invasive and noxious weeds which currently does not occur in LCT habitat. Furthermore, the availability of insect biological controls approved for release by the U.S. Department of Food and Agriculture is limited to only a few species and therefore cannot always be used. However, as discussed in previous sections, alterations to LCT habitat from wildfire or other disturbance may result in conditions that are conducive to the use of insect biological controls (i.e. expansion of noxious weed infestation).

The release of insects to manage noxious weeds within the CIWMP poses a slight risk to native vegetation that may occur along occupied stream channels for LCT. These agents are effective in targeting undesirable species; however, occasionally insects will consume neighboring plants or use other plants for larval development which may reduce the viability of a portion of the non-target plants within a population. However, non-target plants used by these agents are typically a plant that is closely related or within the same family as the target plant (Suckling et al 2014). For example, a biocontrol insect designed to treat musk thistle, which is in the Asteraceae family, may seek out other, non-target thistle species in the area for forage and or larval development. However, the potential for this to occur is considered extremely small and would only impact a few individual plants. Although there are currently very few weed populations in proximity to LCT habitat, a large disturbance such as wildfire could allow those populations to expand and become detrimental to riparian native plant communities. Depending on the noxious weed species present, insect biological controls can benefit LCT habitat over the long-term by reducing noxious weed populations and allowing for an increase in a robust and stable native plant community.

Herbicide- A detailed discussion of the herbicides proposed and their potential effects to aquatic species is provided at the beginning of this Section (Section IX). As mentioned above, every effort will be made to treat noxious weeds by hand within habitat for LCT. If it is determined that the use of herbicides is necessary, only dip & clip and/or wicking & wiping applications of aquatic formulation of Glyphosate or Imazapyr will be used within 50ft of occupied habitat. These methods are considered 'direct application' because they are applied directly to the plant minimizing any potential inadvertent drift to non-target species. The highest concentration of the active ingredient proposed for use (according to label direction) for these chemicals is well below the LC50's for fish for any of the chemicals (Appendix A). Because any herbicides used within 50feet of LCT habitat will be applied directly to individual plants through wiping and wicking, there is minimal chance for accidental drift and thus bioaccumulation of these chemicals in the soil or water. There would be no measurable direct impacts to LCT populations due to the presence of treatment crews and their treatment equipment (clippers, shovels, etc). Any disturbance to LCT such as flushing them from to another location in the stream would be very temporary and over a short duration of time and would not result in any long term impacts to the population.

Prescribed Burning: There will be no effect to LCT from prescribed burning. Prescribed burning would not be used within 300 feet of occupied habitat for LCT within the project area. Prescribed burning can be an effective management tool in treating large monocultures of invasive species such as cheatgrass and medusahead. However, prescribed burns can also occasionally inadvertently result in negative effects such as removal of native riparian

vegetation. The 300 foot buffer will eliminate any potential risk to LCT and LCT habitat from prescribed burning that occurs outside of this corridor.

Cumulative Effects

The stocking of non-native fish caused the extirpation of Lahontan cutthroat trout from much of their native range. Not all stocking activities have been documented; and it is assumed that most perennial streams with adequate access were stocked at some time with non-native fish.

Restoration efforts also have the potential to affect Lahontan cutthroat trout. Previous and potential future management efforts to protect and restore the Lahontan cutthroat trout primarily involve: 1) mechanical and chemical treatments to remove competing or hybridized fish, 2) transplants to restore fish populations in fishless waters, 3) land exchanges to secure essential habitat, 4) fishing closures, and 5) fish habitat restoration projects.

Within the Walker River basin there is currently one active restoration project occurring on Silver Creek to mechanically remove non-native trout. This effort by the California Department of Fish and Wildlife (CDFW) has been occurring since 2010 and will continue into the future.

Due to drought conditions in 2015, California Department of Fish and Wildlife conducted a fish rescue within the project area in By-Day Creek. All fish encountered were captured and moved to other existing populations. The current status of the remaining population in By-Day Creek is unknown.

The actions proposed for this project will have no measureable negative cumulative effects on LCT. However, over the long term, the removal of non-native plants from riparian native plant communities will help maintain and preserve important habitat characteristics for LCT.

Determination

Based on the above analysis, it is determined that treatment methods associated with the California Integrated Weed Management Project including, manual, mechanical, biological, and herbicide use, **may affect but are not likely to adversely affect the Lahontan cutthroat trout.** This determination is based on:

- **Weed treatments within habitat for the Lahontan cutthroat trout will consist primarily of manual methods only. Manual treatments, though limited generally to individual occurrences of noxious weeds, may still cause some disturbance to LCT during treatment activities**. **Any negative effects from disturbance will be temporary and short term.**
- **Mowing and targeted grazing will not occur within 50 feet of occupied Lahontan cutthroat trout streams to minimize potential streambank disturbance and damage to native vegetation. The use of insect biological controls will help reduce non-native plants and have minimal impact on native riparian vegetation.**
- **The use of herbicides poses a minor risk to Lahontan cutthroat trout as any inadvertent drift of chemicals during weed treatments may negatively affect water quality. If herbicides are needed, only aquatic formulations will be used within 50 feet of an occupied stream for LCT. Using the direct application method and following all appropriate BMPs and label directions will minimize the ability for chemicals to runoff or enter the stream environment and potentially cause negative effects to the Lahontan cutthroat trout**.

The remaining activities associated with the California Integrated Weed Management Project, including **mulching, tarping and prescribed burning** will have **no effect** on the Lahontan cutthroat trout because:

- **The above listed activities will not occur within habitat for the species and therefore will have no direct, indirect or cumulative effect on Lahontan cutthroat trout.**

SIERRA NEVADA YELLOW-LEGGED FROG

Under the proposed action, treatment and control of noxious weeds would benefit Sierra Nevada yellow-legged frogs (SNYLF) over the long term by improving and maintaining habitat conditions. However, disturbance associated with treatment activities but may result in adverse effects to individual SNYLFs. Noxious weed infestations in occupied and critical habitat for SNYLF are currently limited to only a few small isolated areas. Because weed infestations in SNYLF habitat are currently small, it is all the more important to apply Early Detection Rapid Response (EDRR) practices to assure those populations do not expand. In general, high elevation, alpine habitat communities associated with SNYLFs are not conducive to large infestations of noxious and invasive weeds. However, changing climates and the potential for a large disturbance such as wildfire, could provide the conditions suitable for expansion of small individual weed infestations. Therefore, it is also important to apply EDRR for all future weed infestations to help maintain native plant communities and high quality habitat for the SNYLF.

Within SNYLF critical habitat in the project area, there is currently one small infestation (0.98 acres) of curly dock that occurs near the Wolf Creek drainage on the Bridgeport Ranger District (see Table 7). While this infestation occurs within critical habitat for SNYLFs, it does not occur in occupied habitat or within habitat considered to contain PCE's for the species. Herbicide treatment is generally considered the most appropriate treatment method for curly dock, but occasionally can be hand pulled if just a few plants. Outside of critical habitat, a 14 acre infestation of bull thistle occurs in potentially suitable habitat for SNYLFs on the Carson Ranger District near Scott's Lake. Although this infestation of has been mapped as 14 acres, it actually occurs as several individual small populations within a 14 acre area and is not a contiguous patch of bull thistle. Treatment of this population would include hand pulling as well as potentially using herbicide treatments.

The following Design Features (listed in Section VII) were incorporated into the proposed action to minimize effects to Sierra Nevada yellow-legged frogs and critical habitat from project activities:

- (DF #31) During the Annual Implementation Process, the Forest Fisheries Biologist will review new treatment sites identified under EDRR that are within 500 feet of Sierra Nevada yellow-legged frog or Yosemite toad occurrences or within their designated critical habitats. Treatment strategies in these areas, including applying buffers, limited operating periods, and relocating individual amphibians, will be developed collaboratively an annual basis by the noxious weed coordinator and the Forest Fisheries Biologist to assure treatment efforts minimize impacts to frog and toad populations and critical habitat.
- (DF#32)- Weed treatments within occupied, critical habitat, and potential breeding areas in suitable habitat for Sierra Nevada yellow-legged frog and Yosemite toad will consist only of manual methods (hand pulling, digging, clipping and bagging) or direct hand application of herbicide (dip and clip, wick and wipe). Other manual methods, including tarping and mulching, will not be used within Sierra Nevada yellow-legged frog or Yosemite toad occupied or critical habitat. While these methods can be effective in controlling noxious weeds, they are not feasible

to implement and maintain in the remote settings where Sierra Nevada yellow-legged frogs and Yosemite toads are located.

- (DF#33)- Immediately prior to any treatment activities in occupied habitat, a Forest Service biologist who is trained in identifying and handling rare amphibians, will survey the area for Sierra Nevada yellow-legged frogs and/or Yosemite toads. If individuals are found they will be relocated to a safe location that is nearby but out of potential harm's way from treatment activities. In most cases this will be less than 100 feet from the original location of the amphibian.
- (DF#34)- In occupied habitat, weed treatments will not be conducted within 50 feet of known breeding locations for Sierra Nevada yellow-legged frog and Yosemite toad until after metamorphosis has occurred. Metamorphosis typically occurs around July 31st and will be confirmed with a follow-up survey.
- (DF#35)- To minimize disturbance to Sierra Nevada yellow-legged frogs and Yosemite toads, treatments in occupied areas for these species may only occur on a maximum of ½ acre per year not to exceed 1/10 of an acre in any given location.
- (DF#36)- Within potential breeding areas considered suitable habitat for Sierra Nevada yellow-legged frogs (lakes and streams) or Yosemite toad (ponds and surrounding meadows), a maximum of ½ acre will be treated per year not to exceed 1/10 of an acre in any given location. If surveys determine the suitable habitat is not occupied, treatment acre limits would not apply.

Direct and Indirect Effects of Individual Treatment Methods:

Manual- Manual methods proposed within occupied habitat, critical habitat or suitable breeding habitat for SNYLFs include hand-pulling, digging individual plants, and cutting and bagging individual plants. Direct effects from manual methods to SNYLFs include flushing frogs from riparian areas and potentially inadvertently stepping on individuals during treatment activities. Sierra Nevada yellow-legged frogs have been known to travel up to 82 feet away from aquatic habitat although typically they are remain within one meter from the water's edge (USDI 2014a). Disturbance during treatment activities could result in injury and or mortality to individual SNYLFs. Under the proposed action, design features #31- 36 would reduce the risk of potential disturbance and/or harm to SNYLFs. For example, design feature #33 requires that individual frogs be moved away from treatment areas to avoid being inadvertently stepped on by crew members. Although moving frogs can result in some disturbance to frogs, the disturbance would be short term and SNYLFs would likely return to their original location (approximately 100 feet away) shortly after treatment crews leave the area. In addition, to assure frogs are moved carefully and with the least amount of stress, only biologists trained in handling amphibians will be allowed to move them. Design feature #34 also reduces the potential for adverse effects to SNYLFs by avoiding breeding areas until metamorphosis has occurred. To further reduce disturbance to SNYLFs and potential long term negative effects, design feature #35 limits treatment activities in occupied habitat to $1/10^{th}$ of an acre per year. This design feature will allow treatments to effectively be conducted during one day without the need for repeated entries and subsequent increased disturbance to SNYLFs.

Other manual methods, including tarping and mulching, will not be used within SNYLF occupied or critical habitat. While these methods can be effective in controlling noxious weeds, they are not feasible to implement and maintain in the remote settings where SNYLFs are located.

Herbicide- A detailed discussion on the potential effects of herbicides to aquatic species was presented at the beginning of section IX. However, there has been limited specific research on the effects of the proposed chemicals on amphibians. Of the herbicides that have been studied for amphibians, the highest concentration of active ingredients proposed for use (according to label direction) within the CIWMP is well below the LC50's (Lethal concentration that could affect 50% of the population) for amphibians (Appendix A). More applicable than LC50, however, is the chance of sub-lethal effects on individual amphibians that can occur at a much lower concentration. Individual SNYLFs could be present within riparian areas that are proposed for treatment, potentially exposing them to herbicides. To minimize potential negative effects to SNYLFs, under the Proposed Action herbicide use within SNYLF habitat will only be applied through direct application of herbicide (dip and clip, wick and wipe). This technique will reduce the amount of herbicide needed to treat noxious weeds, as well as reduce the potential for accidental drift to SNYLFs and other wildlife and plant species. Furthermore, only herbicides that have a registered aquatic label and are considered low toxicity to aquatic species will be used within SNYLF habitat (Habitat®, Rodeo®). Before any treatments can occur in occupied, critical or suitable breeding habitat for SNYLF, a qualified biologist will survey the area for SNYLFs. If individuals are found, they will be relocated to a safe location adjacent to the treatment area. Potential for negative effects to SNYLFs from disturbance associated with herbicide weed treatment activities would be the same as with manual treatments and are discussed above under manual treatments.

Mechanical, Biological Control and Prescribed Burn- Under the Proposed Action, mechanical, biological control and prescribed burn treatments will not occur in SNYLF occupied habitat, critical habitat or within potential breeding areas within identified suitable habitat.

Direct and Indirect Effects to Critical Habitat

As mentioned above, only manual methods and direct application of herbicides will be used within critical suitable (breeding areas) and occupied habitat for SNYLFs. Of most concern from herbicide application would be a significant reduction in vegetation that is necessary for dispersal and foraging (PCE 3(a) iv). Design feature #32 limits any impacts to this PCE by only allowing methods that target individual plants. In addition, Design features #35 and #36, limit the amount of acreage treated within critical and suitable habitat which will also limit the reduction of vegetation needed for dispersal and foraging.

Short-term effects to critical habitat for the SNYLF could occur during physical removal of non-native plants. Effects may include small amounts of ground disturbance where individual weeds are pulled, as well as some minor trampling of native riparian vegetation along streambanks from crews working in the area. However, crew size for treatments will generally be limited to only two people and treatments will likely only take one to two days a year to complete. Ground disturbance will occur only around individual plants and will affect only a small fraction of available habitat. Because only direct application methods of herbicides will be used (where herbicide is applied directly to the individual weed) within habitat for SNYLF, the potential for bioaccumulation of these chemicals in the soil or water is minimal. Overall, any negative effects to critical habitat from treatment methods will minor and short term and will not adversely modify habitat conditions for the SNYLF. In the long-term, actions to control non-native plants would benefit SNYLF by allowing native vegetation to recover and reducing the potential for future infestations to occur.

Cumulative Effects

Transmission of disease, especially Chytrid fungus, is probably the greatest threat to SNYLF populations. Currently it is believed that the Carson and Walker River drainages are currently positive for Chytrid. The introduction and persistence of non-native fish that have been stocked into historically fishless waters has led to a large decline in the available habitat for SNYLF.

In the headwaters of the West Walker River drainage there is currently an ongoing non-native fish removal project for the restoration of fishless Sierra Nevada yellow-legged frog habitat. To date, three high mountain lakes are now considered fishless. California Department of Fish and Wildlife, along with the Humboldt-Toiyabe are currently working to remove fish from a fourth lake. Actions associated with of the California Integrated Weed Management project will not cumulatively result in any long term negative effects to SNYLF populations. Treatment of non-native plants within critical and occupied habitat will help improve and maintain habitat quality for the SNYLF over the long term.

Determination

Occupied Habitat- Based on the above analysis it is determined that two of the treatment activities associated with the California Integrated Weed Management Project**,** manual treatments (hand pulling, clipping and bagging) and herbicide use**, may affect and are likely to adversely affect the Sierra Nevada yellow-legged frog.** This determination is based on:

- **The potential for individual Sierra Nevada yellow-legged frogs to be negatively impacted during manual and/or herbicide treatments. Individual frogs will be moved prior to weed treatments to protect them from disturbance associated with manual and herbicide treatments. However, the act of moving frogs may result in negative effects such as shock that may lead to mortality. Individual Sierra Nevada yellow-legged frogs that are missed and not moved prior to treatment may be subject to exposure of herbicides from drift during application. Little research has been done on the effects herbicides may have on amphibians in general and no research has been done on Sierra Nevada yellow-legged frogs specifically. Utilizing direct application techniques and appropriate herbicides for aquatic habitat types will reduced potential negative effects.**

The remaining activities associated with the California Integrated Weed Management Project, including mowing, mulching, tarping, biological controls and prescribed burning will have **no effect** on the Sierra Nevada yellow-legged frog. This determination is based on:

- **The above listed activities will not occur within habitat for the species and therefore will have no direct, indirect or cumulative effect on Sierra Nevada yellow-legged frog.**

Designated Critical habitat-Based on the above assessment, it is determined that actions associated with the California Integrated Weed Management Project **may affect but are not likely to adversely affect critical habitat for the Sierra Nevada yellow-legged frog. This determination is based on:**

- **The limited ground disturbing activities proposed in critical habitat, the extensive design features associated with the proposed action, and the long term beneficial effects that will result from controlling and eradicating noxious weeds within critical habitat for Sierra Nevada yellow-legged frogs.**

YOSEMITE TOAD

Under the proposed action, treatment and control of noxious weeds would benefit Yosemite toads over the long term by improving and maintaining habitat conditions. However, disturbance associated with treatment activities but may result in adverse effects to individual Yosemite toads. Within the project area, there are no known noxious weed infestations in occupied and critical habitat for Yosemite toad and only one infestation in unoccupied suitable habitat. Because weed infestations in Yosemite toad habitat are currently small, it is all the more important to apply Early Detection Rapid Response (EDRR) practices to assure this population does not expand. In general, high elevation, alpine habitat communities associated with Yosemite toads are not conducive to large infestations of noxious and invasive weeds. However, changing climates and the potential for a large disturbance such as wildfire, could introduce new infestations. Therefore, it is also important to apply EDRR for all future weed infestations to help maintain native plant communities and high quality habitat for the Yosemite toads.

Currently there are no known location of noxious weeds within any occupied or unoccupied critical habitat for Yosemite toad. Outside of critical habitat, there is currently one small infestation (0.98 acres) of curly dock that occurs in unoccupied suitable habitat near the Wolf Creek drainage on the Bridgeport Ranger District. Herbicide treatment is generally considered the most appropriate treatment method for curly dock, but occasionally can be hand pulled if just a few plants.

The following Design features were incorporated into the proposed action to minimize effects to Yosemite toads from project activities:

- (DF #31) During the Annual Implementation Process, the Forest Fisheries Biologist will review new treatment sites identified under EDRR that are within 500 feet of Sierra Nevada yellow-legged frog or Yosemite toad occurrences or within their designated critical habitats. Treatment strategies in these areas, including applying buffers, limited operating periods, and relocating individual amphibians, will be developed collaboratively an annual basis by the noxious weed coordinator and the Forest Fisheries Biologist to assure treatment efforts minimize impacts to frog and toad populations and critical habitat.
- (DF#32)- Weed treatments within occupied, critical habitat, and potential breeding areas in suitable habitat for Sierra Nevada yellow-legged frog and Yosemite toad will consist only of manual methods (hand pulling, digging, clipping and bagging) or direct hand application of herbicide (dip and clip, wick and wipe). Other manual methods, including tarping and mulching, will not be used within Sierra Nevada yellow-legged frog or Yosemite toad occupied or critical habitat. While these methods can be effective in controlling noxious weeds, they are not feasible to implement and maintain in the remote settings where Sierra Nevada yellow-legged frogs and Yosemite toads are located.
- (DF#33)- Immediately prior to any treatment activities in occupied habitat, a Forest Service biologist who is trained in identifying and handling rare amphibians, will survey the area for Sierra Nevada yellow-legged frogs and/or Yosemite toads. If individuals are found they will be relocated to a safe location that is nearby but out of potential harm's way from treatment activities. In most cases this will be less than 100 feet from the original location of the amphibian.
- (DF#34)- In occupied habitat, weed treatments will not be conducted within 50 feet of known breeding locations for Sierra Nevada yellow-legged frog and Yosemite toad until after

metamorphosis has occurred. Metamorphosis typically occurs around July 31st and will be confirmed with a follow-up survey.

- (DF#35)- To minimize disturbance to Sierra Nevada yellow-legged frogs and Yosemite toads, treatments in occupied areas for these species may only occur on a maximum of ½ acre per year not to exceed 1/10 of an acre in any given location.
- (DF#36)- Within potential breeding areas considered suitable habitat for Sierra Nevada yellow-legged frogs (lakes and streams) or Yosemite toad (ponds and surrounding meadows), a maximum of ½ acre will be treated per year not to exceed 1/10 of an acre in any given location. If surveys determine the suitable habitat is not occupied, treatment acre limits would not apply.

Direct and Indirect Effects of Individual Treatment Methods:

Manual- Manual methods proposed within occupied habitat, critical habitat or suitable breeding habitat for Yosemite toads include hand-pulling, digging individual plants, and cutting and bagging individual plants. Direct effects from manual methods to Yosemite toads include flushing toads from breeding ponds and meadows and/or potentially inadvertently stepping on individuals during treatment activities. Disturbance during treatment activities could result in injury and or mortality to individual Yosemite toads. Yosemite toads spend much of their life cycle on land near their breeding areas which makes them potentially vulnerable to human disturbance. Under the proposed action, design features #31- 36 would reduce the risk of potential disturbance and/or harm to Yosemite toads from treatment activities. For example, design feature #33 requires that individual toads be moved away from treatment areas to avoid being inadvertently stepped on by crew members. Although moving toads can result in some disturbance to toads, the disturbance would be short term and Yosemite toads would likely return to their original location (approximately 100 feet away) shortly after treatment crews leave the area. In addition, to assure Yosemite toads are moved carefully and with the least amount of stress, only biologists trained in handling amphibians will be allowed to move them.

Design feature #34 also reduces the potential for adverse effects to Yosemite toads by avoiding breeding areas until metamorphosis has occurred. To further reduce disturbance to Yosemite toads and potential long term negative effects, design feature #35 limits treatment activities in occupied habitat to $1/10^{th}$ of an acre per year. This design feature will allow treatments to effectively be conducted during one day without the need for repeated entries and subsequent increased disturbance to Yosemite toads.

Other manual methods, including tarping and mulching, will not be used within Yosemite toad occupied or critical habitat. While these methods can be effective in controlling noxious weeds, they are not feasible to implement and maintain in the remote settings where Yosemite toads are located.

Herbicide- A detailed discussion on the potential effects of herbicides to aquatic species was presented at the beginning of section IX. However, there has been limited specific research on the effects of the proposed chemicals on amphibians. Of the herbicides that have been studied for amphibians, the highest concentration of active ingredients proposed for use (according to label direction) within the CIWMP is well below the LC50's (Lethal concentration that could affect 50% of the population) for amphibians (Appendix A). More applicable than LC50, however, is the chance of sub-lethal effects on individual amphibians that can occur at a much lower concentration. During the breeding period, individual Yosemite toads could be present within

riparian areas and wet meadows that are proposed for treatment, potentially exposing them to herbicides. Following the breeding season, Yosemite toads become more terrestrial traveling up to 0.78 miles away to upland habitats. Because toads occupy such a wide range of habitat types throughout the year, there is a higher potential for them to be inadvertently exposed to herbicides during treatment activities. To minimize potential negative effects to Yosemite toads, under the Proposed Action herbicide use within Yosemite toad habitat will only be applied through direct application of herbicide (dip and clip, wick and wipe). This technique will reduce the amount of herbicide needed to treat noxious weeds, as well as reduce the potential for accidental drift to Yosemite toads and other wildlife and plant species. Furthermore, only herbicides that have a registered aquatic label and are considered low toxicity to aquatic species will be used within Yosemite toad habitat (Habitat®, Rodeo®). Before any treatments can occur in occupied, critical or suitable breeding habitat for Yosemite toad, a qualified biologist will survey the area for Yosemite toads. If individuals are found, they will be relocated to a safe location adjacent to the treatment area. Potential for negative effects to Yosemite toads from disturbance associated with herbicide weed treatment activities would be the same as with manual treatments and are discussed above under manual treatments

Mechanical, Biological control and prescribed burn- Under the Proposed Action, mechanical, biological control and prescribed burn treatments will not occur in Yosemite toad occupied habitat, critical habitat or within potential breeding areas within identified suitable habitat.

Direct and Indirect Effects to Critical Habitat

As mentioned above, only manual methods and direct application of herbicides will be used within critical and occupied habitat for Yosemite toads. Of most concern from herbicide application would be a significant reduction in vegetation that would impact PCE 2(a)(i-iv, vi and vii). Design feature #32 limits any impacts to this PCE by only allowing methods that target individual plants. In addition, design features #35 and #36, limit the amount of acreage treated within critical habitat which will also limit the reduction of vegetation needed for cover, foraging, prey resources, predator avoidance, and dispersal corridors.

Short-term effects to critical habitat for the Yosemite toad could occur during physical removal of non-native plants. Effects may include small amounts of ground disturbance where individual weeds are pulled, as well as some minor trampling of native vegetation from crews working in the area. However, crew size for most treatments will generally be limited to only two people and treatments will likely only take one to two days a year to complete. Ground disturbance will occur only around individual plants and will affect only a small fraction of available habitat. Because only direct application methods of herbicides will be used within habitat for Yosemite toad, the potential for bioaccumulation of these chemicals in the soil or water is minimal. Overall, any negative effects to critical habitat from treatment methods will be minor and short term and will not adversely modify habitat conditions for the Yosemite toad. In the long-term, actions to control non-native plants would benefit critical habitat for Yosemite toad by allowing native vegetation to recover and reducing the potential for future infestations to occur.

Cumulative Effects

Loss or alteration of suitable breeding habitat can reduce reproductive success, which may have a profound impact when population numbers are small. Past management and development activity has played a role in the degradation of meadow habitats within the Sierra Nevada.

Human activities within these habitats include grazing, timber harvest, fuels management, recreation, and water development.

Actions associated with of the California Integrated Weed Management project will not cumulatively result in any long term negative effects to Yosemite toad populations. Treatment of non-native plants within critical and occupied habitat will help improve and maintain habitat quality for the Yosemite toad over the long term.

Determination

Occupied Habitat- Based on the above analysis it is determined that two of the treatment activities associated with the California Integrated Weed Management Project**,** manual treatments and herbicide use**, may affect and are likely to adversely affect the Yosemite toad.**

This determination is based on:

- **The potential for individual Yosemite toads to be negatively impacted during herbicide and/or manual treatments. Individual toads will be moved prior to weed treatments to protect them from disturbance associated with manual and herbicide treatments. However, the act of moving toads may result in negative effects such as shock that may lead to mortality. Individual toads that are missed and not moved prior to treatment may be subject to exposure of herbicides from drift during application. Little research has been done on the effects herbicides may have on amphibians in general and no research has been done on Yosemite toads specifically. Utilizing direct application techniques and appropriate herbicides for aquatic habitat types will reduced potential negative effects.**

The remaining activities associated with the California Integrated Weed Management Project, including mowing, mulching, tarping, biological controls and prescribed burning will have **no effect** on the Yosemite toad. This determination is based on:

- **The above listed activities will not occur within habitat for the species and therefore will have no direct, indirect or cumulative effect on Yosemite toads.**

Designated Critical habitat-Based on the above assessment, it is determined that actions associated with the California Integrated Weed Management Project **may affect but are not likely to adversely affect critical habitat for the Yosemite toad. This determination is based on:**

- **The limited ground disturbing activities proposed in critical habitat (manual and herbicide treatments), the extensive design features associated with the proposed action, and the long term beneficial effects that will result from controlling and eradicating noxious weeds within critical habitat for Yosemite toad.**

B. TERRESTRIAL SPECIES

SIERRA NEVADA BIGHORN SHEEP

Under the proposed action, effects to Sierra Nevada bighorn sheep (SNBS) and their designated critical habitat from weed treatment methods would be minimal, have no long term negative effects, and eventually be beneficial.

Currently there are no known occurrences of any noxious our invasive weeds that occur in occupied or unoccupied critical habitat for SNBS. Additionally, there are no known or mapped locations of weeds above 8,000 feet anywhere in the Bridgeport area and only one mapped location occurs between 7,000 and 8,000 feet (curly dock) (See figure 9). Sierra Nevada bighorn sheep occur in sparsely vegetated plant communities located at high elevation areas (between 7,000 and 14,000 feet) that are typically not susceptible to noxious and invasive weed infestations. These environments tend to have low vegetation densities due to the granitic, rocky soil types, short growing season and other ecological factors. Noxious and invasive weeds rarely occur in these environments and then only occur typically as isolated individual plants rather than large homogenous infestations. However, changing climates and the potential for a large disturbance such as wildfire, could provide the conditions suitable for development of or expansion of small individual weed infestations. Therefore, it is also important to apply EDRR for all future weed infestations to help maintain native plant communities and high quality habitat for SNBS.

If treatments are needed in the future to control and/or eradicate noxious weeds in SNBS habitat, the following design features incorporated into the Proposed Action would minimize effects to SNBS from project activities**:**

- (DF#43) To minimize disturbance to Sierra Nevada bighorn sheep, weed treatments will not be conducted in any occupied habitat during the lambing period which typically occurs between April and mid-July (USDI 2000).

- (DF#44) To minimize the potential for conflict between domestic livestock and Sierra Nevada bighorn sheep, the use of domestic sheep and goats as biological controls will not be used on any occupied or designated critical habitat for Sierra Nevada bighorn sheep. The use of insect biological controls will also not be used in occupied and/or critical habitat for Sierra Nevada bighorn sheep.

- (DF#45)-To minimize potential disturbance to Sierra Nevada bighorn sheep and their habitat, the use of mechanical treatments (mowing, trimming) and prescribed burning to treat noxious weeds will not be used in Sierra Nevada bighorn sheep occupied and/or critical habitat.

- (DF#46)- Within Sierra Nevada bighorn sheep occupied and critical habitat, every effort will be made to treat weeds by hand pulling and or clipping and bagging. If herbicides are determined to be necessary to treat a weed population, they will be applied by hand using the dip and clip or wick and wipe method to avoid potential negative effects to sensitive sub-alpine native plant communities which are important to Sierra Nevada bighorn sheep.

- (DF# 47)-Other manual methods, including tarping and mulching, will not be used within Sierra Nevada bighorn sheep occupied or critical habitat. While these methods can be effective in controlling noxious weeds, they are not feasible to implement and maintain in the remote settings where Sierra Nevada bighorn sheep are located.

Direct and Indirect Effects of Individual Treatment Methods:

Herbicide use: Under the proposed action there will be no measurable effect to SNBS or their designated critical habitat from the use of herbicides to treat noxious and invasive species. As mentioned above the potential for future populations of noxious and invasive weeds to occur in SNBS habitat is very low due to the high elevation and rocky soil types associated with the

species. Any noxious weeds that may potentially occur in this area would likely be single, isolated plants that could most likely effectively be treated with hand pulling and bagging techniques. Herbicides would only be used in the rare instances when hand pulling was determined to not be effective and the threat of infestation of native plant communities was eminent.

Off-target drift and movement of chemicals through soils can occur when using herbicides. Drift is the movement of any herbicide through the air to areas not intended for treatment. Drift includes volatilization, where some herbicides may be rapidly lost as vapors after application. Drift depends on droplet size, wind speed and direction, height above ground of the application, herbicide formulations and ambient temperature. Runoff occurs when water moves over the surface of a treated area that can carry herbicide with it. The greatest loss of herbicide occurs when the herbicide is applied to the soil surface and is washed off by the first rain after application.

To minimize the potential for drift in SNBS occupied and critical habitat, weeds would be individually treated using the wicking and wiping method or the dipping and clipping technique. Both of these methods result in herbicide being applied to the main stem of the weed and greatly reduces the amount of herbicide needed to treat noxious weeds as well as the potential for inadvertent drift to non-target species. These methods also reduce the potential for surface runoff and/or leaching of herbicides into the soil because herbicide applications would only be applied to the main stem of the plant and not to the soil surface.

When working with herbicides there is a remote risk of accidental spills or other exposure scenarios other than those described above. To limit the potential for herbicide spills impacting SNBS or their habitat, mixing and loading of herbicides into backpack sprayers or other hand held devices, would not occur in or near any occupied habitat for this species. Mixing will occur only on level, disturbed sites off of roadways, such as the interior of landings, and water drafting from aquatic features would not occur. An additional exposure scenario that could affect SNBS is accidental equipment malfunction when treating invasive plant infestations near occupied locations. Project design features requiring regular inspection and tests of all equipment used for herbicide application would greatly reduce the risk of herbicides spills when working in these sensitive areas. In addition, a small spill containment kit would be carried by herbicide applicators when wicking and wiping to further limit potential effects in the event of equipment failure.

According to Human Health and Ecological Risk Assessment reports prepared by Syracuse Environmental Research Associates (SERA), six of the seven chemicals proposed for use under the Proposed Action are considered to be low toxicity to birds and mammals including *Glyphosate (aquatic formulation), Aminopyralid, Chlorsulfuron, Imazapyr, Sulfometuron-methyl* (SERA 2011a, 2007, 2004a, 2011b, 2004b) *and Rimsulfuron* (USDI 2014e), and These reports utilize the best available science to describe the level of herbicide expected to be introduced, persist, and transport within plant communities, and to evaluate the likelihood of subsequent adverse ecological effects. These assessments use peer-reviewed articles from the open scientific literature and current EPA documents. The likelihood that an animal will experience adverse effects from an herbicide depends on: (1) toxicity of the chemical, (2) the amount of chemical to which an animal is exposed, (3) the amount of chemical actually received by the animal (dose), and (4) the inherent sensitivity of the animal to the chemical, all of which are evaluated in FS/SERA risk assessments.

As part of the Risk Assessment, a "toxicity threshold" is established for each herbicide to indicate the point below which adverse effects would not be expected for a variety of organisms (e.g. people, wildlife, fish). The predicted level of exposure from herbicide use is compared to the toxicity threshold and expressed in terms of a "hazard quotient (HQ)." The Hazard Quotient is the amount of herbicide or additives to which an organism may be exposed over a specified period, divided by that estimated daily exposure level at which no adverse health effects are likely to occur. An HQ less than or equal to one indicates an extremely low level of risk. Toxicity thresholds are based on extrapolated laboratory results and accepted scientific protocols. The probability of harmful effects increases with HQ.

Review of exposure scenarios and risk characterizations for *Glyphosate (Aquatic formulation), Aminopyralid, Chlorsulfuron, Imazapyr, Rimsulfuron, Sulfometuron-methyl* indicate that for both acute and chronic exposures to mammals, hazard quotients are below the threshold of concern, 1.0, in all exposure scenarios. The assessments included consideration of accidental acute exposure (from direct spray, or contamination following a spill), non-accidental acute exposures (from contaminated vegetation, water, or consumption of contaminated insects or small mammals), and from chronic/longer term exposures associated with consumption of contaminated vegetation, water, or fish). The weight of evidence from available studies suggest that no adverse effects to mammals are plausible using typical or worst-case exposure assumptions at application rates proposed in this project. Hazard quotients for all exposure scenarios, at both the central and upper range, are well below one (the level where potential effects from doses are considered discountable). This indicates there is a low level of concern that application of these herbicides would negatively affect SNBS, especially considering the very low application rates that would be necessary to treat isolated individual weed species within SNBS habitat.

Review of the risk for *triclopyr*, however, indicates that HQs exceed the level of concern (HQ > 1) for exposures to mammals involving the consumption of contaminated vegetation (SERA. However, the HQs are based on worst case scenario exposures and do not account for factors such as timing and method of application, animal behavior and feeding strategies and/or implementation of project design criteria. Under the Proposed Action, *triclopyr* would not be used in or near SNBS habitat. On the HTNF, Triclopyr is used rarely and only used in targeted situations to treat salt cedar tamarisk which occurs at low elevations as scattered, isolated populations.

To minimize potential disturbance to SNBS from weed treatment activities, herbicide treatments would not be conducted until after the lambing period for SNBS (after July). Although lambing is currently not known to occur within the project area, this design feature will provide protection for ewes and their newborn lambs that may wander into the project area while the lambs are still young and vulnerable to disturbance.

Manual Methods: Manual methods include hand digging individual plants and pulling and clipping flower heads and bagging them. As mentioned above, any noxious weeds that may occur in the future within SNBS habitat would likely occur as isolated individual plants that could easily be hand pulled, and removed from the area. Direct effects to SNBS from manual treatment methods include disturbance to sheep from human activity during pulling and clipping activities. Sheep may flush from a treatment site and avoid the area while activities are occurring. Furthermore, just as with herbicide treatments, no manual treatments would occur during the lambing period to avoid disturbing SNBS during this critical period. Outside of this time period, hand pulling activities would likely be accomplished in one day and usually by no

more than two people. Manual treatments may need to be repeated annually but would continue to require minimal disturbance. Mulching and tarping would not be used in habitat for SNBS as they are not feasible to maintain in the remote settings where SNBS are located. Therefore, any effects to SNBS from manual weed treatments would be minimal and have no long term effects on the population.

Mechanical, Biological Controls, and Prescribed burning: There will be no effect to SNBS from mechanical, biological controls or prescribed burning treatment methods because these methods will not be used within occupied or critical habitat for SNBS. Mechanical, biological, and prescribed burning methods are appropriate when treating large monocultures of invasive or noxious weed species which do not occur in the high elevation habitats associated with SNBS.

Direct and Indirect Effects to Critical Habitat

As mentioned above, the project area includes approximately 4,239 acres of designated critical habitat for SNBS. Direct effects to designated critical habitat include those which may lead to adverse effects of the PCEs of critical habitat. The PCEs listed for SNBS include; 1) maintaining habitats with open, escape terrain at elevations of 4,000 to 14,100 feet in elevation and 2) maintaining vegetation communities within these elevational ranges (sagebrush-bitterbrush-bunchgrass scrub; pinyon-juniper woodland and mountain mahogany scrub; mid-elevation and subalpine, meadows, forests, and woodlands; and alpine meadows and other habitats from cliffs to plateaus). Direct impacts leading to modification of these habitat characteristics include those which direct remove or alter these communities. Under the proposed action, any effects to critical habitat and/or the PCEs of that habitat will be minimal and eventually be beneficial. Although infestations of noxious and invasive weeds do not currently occur and are not anticipated in habitat for SNBS, locating and treating sporadic individual occurrences will help maintain native plant communities with critical habitat. In the rare event that noxious weeds are found within SNBS habitat, removing them as quickly and as swiftly as possible will help maintain native plant communities important to SNBS. Treatments will generally be conducted through hand pulling and possibly the use of a shovel to dig up rooted individual plants. This activity will result in some minor ground disturbance but will have no long term effect on soils and other native vegetation. Similarly, if herbicides are needed they would be applied through direct, hand application techniques only resulting in no negative effect to PCEs within SNBS critical habitat.

Cumulative Effects

Under the proposed action cumulative effects to SNBS will be minimal and ultimately beneficial. As mentioned earlier, disease transmission from domestic sheep or goats is considered to be one of the greatest threats to bighorn sheep. Disease transmission can kill large numbers of bighorn sheep with devastating consequences, particularly for smaller, isolated herds. Implementation of the Integrated Weed Management project will not add to any increased risk of SNBS sheep coming into contact with domestic sheep or goats. Although Biological controls, including the use of grazing animals is a treatment method considered in this proposal, the use of grazing animals would not be used in or near any occupied habitat, designated critical habitat, or any designated herd unit for SNBS. There is some potential for human disturbance associated with treatment efforts to cumulatively effect SNBS who in some locations are already subject to disturbance from human recreation. However, because the potential for noxious weeds to occur in SNBS sheep is considered very low, the need for weed treatments and thus potential human disturbance would also be low and would have no measureable effect on SNBS.

According to the 2007 Recovery Plan, there are no immediate threats to habitat for SNBS (USDI 2007). Almost all of the critical habitat is considered stable and intact due to the majority of it occurring within Public ownership (U.S. Forest Service, National Park Service and Bureau of Land Management). In addition, the relatively high elevation of the habitat limits the number of roads and other types of disturbance that might be associated with public lands at lower elevations. Under the proposed action, there are no activities that would add to or increase threats to critical habitat. As mentioned earlier, by locating and treating noxious weeds, native plant communities and high quality habitat SNBS is maintained.

Determination

Occupied Habitat- Based on the above analysis it is determined that two of the treatment activities associated with the California Integrated Weed Management Project**,** manual treatments and herbicide use**, may affect but are not likely to adversely affect the Sierra Nevada bighorn sheep.** This determination is based on:

- **Currently there are no weed infestations in occupied habitat for Sierra Nevada bighorn sheep. If future infestations occur, some disturbance to Sierra Nevada bighorn sheep may occur during manual and herbicide weed treatments. However, the disturbance will be minor, short term and will avoid the critical lambing period. Herbicides will be applied using a direct application method to individual noxious weeds which would greatly limit exposure to Sierra Nevada bighorn sheep.**

The remaining activities associated with the California Integrated Weed Management Project, including mowing, mulching, tarping, biological controls and prescribed burning will have **no effect** on the Sierra Nevada bighorn sheep. This determination is based on:

- **The above listed activities will not occur within habitat for the species and therefore will have no direct, indirect or cumulative effect on Sierra Nevada bighorn sheep.**

Designated Critical habitat-Based on the above assessment, it is determined that actions associated with the California Integrated Weed Management Project are **may affect but are not likely to adversely affect critical habitat for Sierra Nevada bighorn sheep. This determination is based on:**

- **The limited ground disturbing activities proposed in critical habitat, the extensive design features associated with the Proposed Action, and the long term beneficial effects that will result from controlling and eradicating noxious weeds within critical habitat for Sierra Nevada bighorn sheep.**

NORTH AMERICAN WOLVERINE

The current distribution of wolverines does not include the project area or the state of California. Although a wolverine was detected on the Tahoe National Forest in 2008, this detection was believed to be an anomaly and not indicative of a larger population (USDI 2013). Forest Carnivore surveys, including for wolverines, have been ongoing in the Sierra Nevada for decades with no detections.

Currently, wolverines appear to be distributed as functioning populations in two regions in the contiguous United States: the North Cascades in Washington, and the northern Rocky Mountains

in Idaho, Montana, and Wyoming USDI 2013, Aubry 2007). Wolverines were likely extirpated, or nearly so, from the entire contiguous United States in the first half of the 20th century, likely from unregulated trapping and widespread predator control (Ibid). It is believed that in the second half of the 20th century and continuing into the present times, wolverine populations expanded into the North Cascades and the northern Rocky Mountains from sources in Canada. However, populations have not been reestablished in the Sierra Nevada Range or the southern Rocky Mountains, despite the known movement of single individual males to each of these areas (USDI 2013).

Although future recolonization of wolverines in California and the Sierra Nevada is possible, it is unlikely to occur during the duration of this project (ten years). Alterations to habitat connectivity from climate change, as well as other anthropomorphic disturbances (infrastructure development, recreation and land management practices) may limit how successful expansion into California may be.

Determination: Based on the above assessment, and the conclusion that wolverines do not occur in the project area and are not expected to occur in the project area within the next ten years, there will be **no effect** to wolverines from activities associated with the California Integrated Weed Management Project.

C. RARE PLANTS

IVESIA WEBBERI

Under the proposed action, effects to *Ivesia webberi* and its designated critical habitat from weed treatment methods include some short term negative effects to individual *Ivesia webberi* plants, but will have no long term negative effects on the population, and eventually will be beneficial.

Ivesia webberi occurs in relatively low elevations in low sagebrush communities that are prone to noxious weeds and invasive species such as cheatgrass and medusahead. Several Nevada *Ivesia webberi* populations occur immediately adjacent to medusahead and some have succumbed to total infestation from the invasive annual grass. Within the project area, medusahead is currently not present in occupied or unoccupied critical habitat. However, approximately 2.57 acres of bull and musk thistle are present within occupied and critical habitat, primarily in the Dog Valley Meadow area. This accounts for approximately 0.54% of all occupied and critical habitat within the project area. Although these infestations are relatively small, weeds occurring outside of critical habitat also pose a potential future threat to Webber ivesia populations. For example, a small patch of medusahead (<.1 acre) occurs within 500 feet of critical habitat in addition to approximately 8.6 acres of noxious weeds (musk thistle and bull thistle). Bull thistle and musk thistle respond well to a variety of treatment methods depending on the size of the population and timing of the treatment. Both thistles can be manually treated through hand pulling and or clipping and bagging or through herbicide treatments using direct foliar spray and/or wiping and wicking. Musk thistle also responds well to insect biological controls when populations are large and contiguous. Medusahead is generally treated with a pre-emergent (late fall) application of herbicide.

One of the main goals of the California Integrated Weed Management Project (CIWMP) is to assure that native and rare plant communities are protected through the control and eradication of non-native invasive species. However, treating invasives in and around rare plants must be conducted with absolute care and caution to minimize impacts to the rare plants we are trying to

protect. The following design features were incorporated into the Proposed Action to minimize effects to *Ivesia webberi* from project activities:

- (DF#50)- During the Annual Implementation Process, all noxious weed treatments proposed within 500 feet of *Ivesia webberi* populations and designated critical habitat would be reviewed by the District and/or Forest Botanist to verify that treatment strategies are consistent with management direction for this species.

- (DF#51)-When herbicide use is determined to be the most appropriate treatment method for broad leaved non-native plants (such as musk thistle) in occupied habitat for *Ivesia webberi*, the dip and clip or wick and wipe method will be used to minimize potential for unintentional drift.

- (DF#52)-To minimize impacts to individual plants, herbicide treatment of non-native grasses within occupied and critical habitat for *Ivesia webberi* will occur in the fall when *Ivesia webberi* is dormant and plant foliage is no longer present.

- (DF#53)-To limit the potential for herbicide spills within *Ivesia webberi* habitat, no mixing and loading of herbicides would occur within occupied or critical habitat for *Ivesia webberi*.

- (DF#54)-All herbicide treatments in occupied and/or critical habitat will occur with hand held backpacks, spray wands, and other direct application equipment. Crew sizes will be limited to two people while conducting treatments. No vehicles such as spray trucks or UTVs will be used within *Ivesia webberi* habitat.

- (DF#55)-While in *Ivesia webberi* habitat, a small containment kit would be carried by herbicide applicators when wicking and wiping to further limit potential effects in the event of equipment failure (i.e. backpack leaking).

- (DF#56)- Prescribed burning will not be conducted within occupied or critical habitat for *Ivesia webberi* to minimize the potential for inadvertent negative effects.

- (DF#57)-To minimize inadvertent damage to individual *Ivesia webberi* plants during digging and hand pulling treatments, weeds that cannot safely be pulled without damaging an Ivesia plant, would be treated by cutting and bagging the flower heads and potentially using dip and clip or wick and wipe herbicide application methods to treat the additional stem.

- (DF #58)-Other manual techniques, including mulching and tarping, would not be used in occupied habitat for *Ivesia webberi* to avoid negative impacts to the species.

- (DF#59)- Prior to conducting weed treatments in unoccupied critical habitat for *Ivesia webberi*, surveys will be conducted within 500 feet of new weed infestations identified for chemical and biological treatment, and within 25 feet of new infestations identified for manual treatment. If *Ivesia webberi* plants are found, design features #50-58 and #61 will be implemented during treatment activities.

- (DF#61)- Where treatments occur within 500 feet of TEPCS or HTNF Watch List plant occurrences, weed crews would be instructed in the proper identification of plant species to be avoided to ensure that individual TEPCS or HTNF Watch List plants are protected. The District or Forest botanist will accompany weed crews during treatments being conducted in occupied habitat for *Ivesia webberi*.

Direct and Indirect Effects of Individual Weed Treatments in Occupied Habitat:

In general, weed treatments conducted in *Ivesia webberi* habitat have the potential to directly affect individual plants from inadvertent trampling from equipment and/or crews working in occupied habitat. Repeated, long term trampling could potentially cause permanent damage and destroy individual plants as well as disturb habitat for the species. However, design features incorporated in to the proposed action will minimize the potential for trampling and consequential effects to *Ivesia webberi.*

For example, under the Proposed Action, no motorized equipment such as spray rigs, UTVs or other vehicles will be used to conduct weed treatments in occupied habitat. Weed treatments in occupied habitat will all be conducted by hand using backpack equipment, shovels or clippers. Weed treatment crews will be limited to two individuals except in cases where the district botanist accompanies the crew. To help reduce the potential for trampling, crews will be trained in how to identify (and therefore avoid) *Ivesia webberi* and will be accompanied by the District botanist when conducting weed treatments in occupied habitat. If any *Ivesia webberi* plants are inadvertently stepped on, the effects of trampling would be minimal as it would only be for a very short duration (a few seconds) and not continually repeated. *Ivesia webberi* is fairly resistant to this type of very short duration impact, particularly during the dormant period for this species, when all blooming and fruit production has ceased. Under the proposed action, any herbicide treatments for invasive grasses will not occur until the fall which corresponds with the dormant period for *Ivesia webberi*.

Herbicides: In general, herbicides can kill or injure plants through direct contact through alteration in their normal growth. Selective herbicides may target different plant groups, such as monocots or dicots, or specific plant families. Herbicides vary in their method of action, potency, selectivity, and persistence. The closer the non-target stem is to the treatment site, the greater is the likelihood of damage to susceptible plants. Additionally, selective herbicides are more likely to affect species within the same family; non-selective herbicides have the potential to affect all plants.

As mentioned in the Affected Environment section, the primary weeds threatening *Ivesia webberi* within the project area include non-native annual grasses and thistles. On the HTNF, herbicides used to control annual grasses, including rimsulfuron (Matrix) and Sulfometuron-methyl (Oust) are used as a pre-emergents that are applied during the fall months. Non-native thistles and knapweeds would either be hand pulled or treated with an herbicide such as aminopyralid (Milestone) or chlorsulfuron (Telar).

The ecological effects of the above herbicides as well as glyphosate (Rodeo), imazapyr (Habitat), and triclopyr (Garlon 3A) are discussed in detail in Human Health and Ecological Risk Assessments produced by Syracuse Environmental Research Associates for each herbicide (SERA 2007, SERA 2004a, SERA 2011a, SERA 2011b, SERA 2004b, USDI 2014e, SERA 2011c). These Risk Assessments take into account applications rates and methods to quantify potential risks to non-target plant species from direct spray, off-target drift, and off-site movement of these herbicides. Surfactants such as Hasten® and Competitor® are modified vegetable oils, which would be very unlikely to produce secondary breakdown products that would act as toxins to rare plant species. In addition, marker dyes such as Hi-light® Blue are water-soluble, contain no listed hazardous substances (SERA 1997, USDA 2007), and would be unlikely to cause adverse effects on rare plant species.

Although species-specific information regarding the direct effects of the seven proposed

herbicides on *Ivesia webberi* is unknown, Risk Assessment hazard quotients that quantify the potential risks to non-target plant species from the proposed action will be used to discuss potential project effects *Ivesia webberi* in occupied habitat.

Potential effects to *Ivesia webberi* from invasive plant treatment involving herbicide include 1) direct exposure (accidental direct spraying or over-spraying) 2) off-target drift 3) movement of chemicals on soil and 4) accidental spills. Risk of affects from the above exposure scenarios will depend on whether the Sensitive plant is susceptible or tolerant to the proposed herbicide.

Direct exposure: Effects from direct exposure are dependent on a combination of factors including the plant species, the timing of the application and method of application, and the herbicide applied. The risk of direct exposure would also be dependent on the selectivity of the application method. Spot spray and broadcast spray have the greatest risk for direct exposure to non-target vegetation if used in the vicinity of *Ivesia webberi*.

Under the Proposed Action, broadleaf weeds, such as thistles, knapweeds, etc, would be individually treated with herbicides using the wicking and wiping method or the dipping and clipping technique where clippers are dipped in herbicide before cutting the target plant. This method cuts the main stem of the weed and leaves herbicide directly on the cut part near the root base. This method greatly reduces the amount of herbicide needed to treat noxious weeds as well as the potential for inadvertent drift to non-target species.

If annual grasses are the target species, herbicide treatments would be conducted in the fall when the growing season for *Ivesia webberi* is completed and the plant is dormant. Using the strategy would reduce the exposure of individual plants to herbicide and minimize potential negative impacts to the species. Residual herbicide may affect the viability of some *Ivesia webberi* seeds. However, seeds of *Ivesia webberi* are relatively large and tend to remain close to the parent plant once they have fallen (USDI 2014d). Because the majority of annual grass treatments will occur on the periphery of *Ivesia webberi* populations (where annual grasses are most prevalent) the potential for seeds to be directly exposed to herbicides is low.

Off-Target Drift: Drift is the movement of any herbicide through the air to areas not intended for treatment. Drift includes volatilization, where some herbicides may be rapidly lost as vapors after application. Drift depends on droplet size, wind speed and direction, height above ground of the application, herbicide formulations and ambient temperature. Distances where drift from spray herbicide applications may effect *Ivesia webberi* were set by identifying the modeled distance where the hazard quotient from drift approached a value of one, based on the average application rate used in Forest Service programs and/or the rates used in the SERA Risk Assessments (Table 12).

Table 12 .Distances from Sensitive[2] Plants where Hazard Quotients (HQ)[1] from spray drift approach a value of 1.

Herbicide	Distance from Plants (feet)	Sensitive[2] plant HQ	Tolerant plant hazard HQ
Aminopyralid (0.11 lb/ac)	500	1.1	<0
Chlorsulfuron (0.056 lb/ac)	900	7	<0
Glyphosate (2 lb/ac)	900	1.7	<0
Imazapyr (1 lb/ac)	900	17	<0
Sulfometuron-methyl (0.045 lb/ac)	900	2	<0
Triclopyr acid (1 lb/ac)	500	0.7	<0
Rimsulfuron (.0469lb/ac)	100	0.833	<0
Rimsulfuron (.0469lb/ac)	900	0.238	<0

[1]HQ less than or equal to 1 indicate that no effects are anticipated to individual plants.
[2]Defined as the species with the greatest sensitivity to low amounts of herbicide, not a Forest Service Sensitive plant.

The drift coefficients used for this analysis are based on a boom application using a fine-coarse droplet spray at 20 inches above the target vegetation with 10 mph wind speeds. This method of treatment would not be used in occupied habitat for *Ivesia webberi*. The majority of herbicide treatments would occur by spot spray with backpack sprayers or by hand with wiping or dip and clip techniques. It is worth noting that the scenario used to quantify the above hazard quotients exceeds a number of restrictions included in the proposed project to limit drift, so the actual drift expected from backpack applications are expected to be lower than the modeled hazards in the Herbicide Risk analysis (SERA 2009). While the SERA worksheets indicate that extremely low amounts of Chlorsulfuron, Glyphosate, Imazapyr and Sulfometuron-methyl may affect intolerant species at >500 feet, these HQ only apply to broadcast applications using a boom which project. In addition, according to the SERA risk assessments for Chlorsulfuron, Glyphosate, Imazapyr, Sulfometuron-methyl, and Rimsulfuron, offsite drift from backpack applications should be reduced substantially compared to broadcast applications from a boom (modeled scenario used in risk assessment), but the extent of this reduction has only been quantified for Imazapyr, which exhibited decreases of approximately 33% (SERA 2011b).

In addition, with the incorporation of design features to limit drift (wind restrictions and low nozzle height) and the targeted use of herbicide (direct foliar spray and wiping methods in sensitive habitat) the effects from drift would be minimized. Overall, there is little risk of mortality or damage to *Ivesia webberi* or other non-target plant species from spray drift.

Movement of chemicals on soil

Surface runoff - is water moving over the surface of a field or treated area that can carry herbicide with it. The greatest loss of herbicide occurs when the herbicide is applied to the soil surface and is washed off by the first rain after application. Applying herbicide to the soil surface is not one of the treatment methods in this Project. Effects to *Ivesia webberi*, near future weed treatment areas from runoff, such as uptake by roots, and translocation to plant organs that injure or kill the plant, would be controlled and minimized by using the application methods presented in the Proposed Action, and by adherence to the design features.

Leaching – occurs when water carries herbicides into and ultimately out of the root zone. The portion lost to leaching depends on soil texture, herbicide solubility, and amount and intensity of rainfall. Impacts from leaching to *Ivesia webberi*, such as uptake by roots and translocation to plant organs where it may injure or kill the plant, would be minimized since applications of herbicide would adhere to the relevant design features in the EA, such as those addressing favorable weather conditions listed above.

Accidental spills: When working with herbicides there is a remote risk of accidental spills or other exposure scenarios other than those described above. To limit the potential for herbicide spills impacting *Ivesia webberi* occurrences, mixing and loading of herbicides would not occur in or near any occupied habitat for *Ivesia webberi*. Mixing will occur only on level, disturbed sites off of roadways, such as the interior of landings, and water drafting from aquatic features would not occur. An additional exposure scenario that could affect *Ivesia webberi* populations is accidental equipment malfunction when treating invasive plant infestations near these locations. Project design features requiring regular inspection and tests of all equipment used for herbicide application would greatly reduce the risk of herbicides spills when working near *Ivesia* populations. In addition, a small spill containment kit would be carried by herbicide applicators when wicking and wiping to further limit potential effects in the event of equipment failure.

Due to the limited number of invasive plant infestations near occupied habitat for *Ivesia webberi* the need for herbicide treatments in these areas will be rare. If herbicides are determined to be the appropriate method, the highly targeted application methods and the incorporation of project design features will greatly minimize the potential for direct and indirect effects on known *Ivesia webberi* occurrences, and those that may be discovered in the future. In addition, effective treatment of noxious weeds would reduce the threat and potential impacts of weeds degrading *Ivesia webberi* populations and its critical habitat; thus, providing beneficial effects over time.

Manual Methods-Manual methods include primarily hand digging and pulling and clipping flower heads and bagging them. Other techniques, including mulching and tarping, would not be used in occupied habitat for *Ivesia webberi* to avoid negative impacts to the species. Hand digging and pulling would be used to treat small populations of individual thistles and knapweed, where hand removal can be effective. Direct effects to individual *Ivesia webberi* plants from manual treatment methods include some minor ground disturbance associated with digging weeds. In addition, digging activities that occur within close proximity to individual *Ivesia webberi* plants may inadvertently be damaged from digging or accidently pulling the plant with the weeds. To minimize inadvertent damage to individual *Ivesia webberi* plants, weeds that cannot safely be pulled without damaging *Ivesia webberi* plants, would be treated by cutting and bagging the flower heads and potentially using dip and clip herbicide methods to treat the stem. Hand pulling and digging activities would likely be accomplished in one day and usually by no more than two people. Manual treatments may need to be repeated annually but would continue to require minimal disturbance.

Other manual techniques, including mulching and tarping, would not be used in occupied habitat for *Ivesia webberi* to avoid negative impacts to the species.

Biological Controls -Biological controls (both targeted grazing and insects) are generally used only when large infestations have become well established and other control methods are not feasible. Both targeted grazing and insects have been used on the Carson Ranger District in Nevada to effectively treat a variety of noxious weeds including, perennial pepperweed, Canada thistle, cheatgrass, and spotted knapweed.

Targeted grazing: Under the Proposed Action, the use of livestock to control noxious and invasive weeds are only used under specific "targeted grazing" conditions. In targeted grazing, the kind of animals and amount and duration of grazing are specifically designed to help control a particular species of plant while minimizing the impacts on perennial native vegetation that is needed to help reduce the likelihood of reinvasion by undesirable plant species. Targeted grazing includes the use of goats, sheep, or other livestock that have been specifically 'trained' by their operators to eat certain plant species. Generally the operator also uses a portable fencing system to help 'target' the animals on focal species.

When managed properly, it has been demonstrated that the use of sheep and goats to manage invasive species such through targeted grazing has improved the conditions of native plant communities by creating spaces within previously infested sites for native grass and forb growth. However, the use of domestic livestock to manage undesirable vegetation can result in some negative effects to *Ivesia webberi* and other native plant communities. To be most effective in treating annual invasive grasses, targeted grazing would likely be conducted during green up of the annual grasses which may, in some years, coincide with the flowering period of *Ivesia webberi*. Impacts from grazing during this period include consumption, trampling, and soil churning. However, for the purposes of weed control, livestock are expected to sweep

through the treatment area, rather than congregate in one place for an extended period, which would limit potential long term, permanent impacts from trampling and other disturbance associated with grazing. Overtime, any short term impacts to *Ivesia webberi* would be offset by overall improved habitat conditions for the species by reducing invasive grass species populations.

Insects*:* Biological control using insects is used to reduce a targeted weed population to an acceptable level by stressing target plants and reducing competition with the desired plant species. Plant-eating insects, nematodes, mites, or pathogens affect plants directly, by destroying vital plant tissues and functions, and indirectly, by increasing stress on the plant, which may reduce its ability to compete with other plants.

The release of insects and pathogens to manage noxious weeds within the CIWMP poses a slight risk to *Ivesia webberi* plants. These agents are effective in targeting undesirable species; however, occasionally insects will consume neighboring plants or use other plants for larval development which may reduce the viability of a portion of the non-target plants within a population. However, non-target plants used by these agents are typically a plant that is closely related or within the same family as the target plant (Suckling et al 2014). For example, a biocontrol insect designed to treat musk thistle, which is in the Asteraceae family, may seek out other, non-target thistle species in the area for forage and or larval development. On the HTNF, biocontrol insects would likely only be used to treat non-native thistle species (including knapweeds). Because *Ivesia webberi* are in a different family than thistles, the risk for any 'spillover' of biocontrol insects onto *Ivesia webberi* plants, is considered very low. Similar to other weed treatments within and near rare plant populations, a reduction in the number of individual weeds is expected to reduce competition for resources, increase native plant community diversity and in turn benefit *Ivesia webberi* over the long-term.

Mechanical mowing and Prescribed Burning-While mechanical and prescribed burning treatments can be an effective tools in treating invasive weeds, due to the relatively barren vegetative communities associated with *Ivesia webberi* and the high potential for invasive weeds to follow ground disturbance and/or fire in these habitat types, mechanical treatments and prescribed burning will not be proposed as a treatment method in occupied or critical habitat for *Ivesia webberi*.

Direct and Indirect Effects of Weed Treatments in Critical Habitat:

Weed treatments conducted in unoccupied critical habitat will be focused on treating invasive weeds to help restore and maintain potential habitat for *Ivesia webberi* as well as minimize a seed source and inadvertent transport of seed into the occupied portions of *Ivesia webberi* habitat. Direct and indirect effects to designated critical habitat include those which may lead to adverse effects of the PCEs of critical habitat. The PCEs listed for *Ivesia webberi* that could potentially be affected from project activities include specific associated plant species/communities such as low sagebrush and other perennial, low-growing plants that do not outcompete *Ivesia webberi* for light; and shallow, clay-like soils that are vernally moist.

Herbicides- In general potential effects to PCEs in critical habitat from the use of herbicides is similar to the effects analysis described for occupied habitat. However, depending on the level of infestation in unoccupied habitat, application methods in critical habitat may vary from those in occupied. For example, larger annual grass infestations may treated using a boom spray application of herbicide rather than a backpack sprayer application. Boom spraying application would occur from a UTV and would only be used when the infestation has formed a complete

monoculture, comprising more than 90% of the plant community over a more than one acre area. Boom sprayer application would strictly adhere to product label guidelines to maintain a pounds per acre ratio that minimizes impacts to non-target species and all design features discussed in previous sections would be followed. In general, the risk of herbicide applications to non-target plants is minimal, due to the methods of application and only using boom spraying when infestations are monocultures. As in occupied habitat, there is a slight risk of damage to native plants from accidental herbicide spills. In the event of a spill, effects would range from decreased productivity or injury to plant death. This risk is minimized through the use of project design features #-50-59 and #61 while applying herbicides. Any effects to critical habitat and the PCEs would be short term and over time, habitat conditions would be improved for potential future colonization of *Ivesia webberi* populations.

Manual Methods: Manual methods would be the same as in occupied habitat and include primarily hand digging and pulling and clipping flower heads and bagging them. These techniques would be used to treat small populations of individual thistles and knapweed, where hand removal can be most effective. Direct effects to PCEs in critical habitat from manual treatment methods include some minor ground disturbance associated with digging weeds. However, effects would be minimal and isolated to the area surrounding the individual plant. Hand pulling activities would likely be accomplished in one day and usually by no more than two people. Manual treatments may need to be repeated annually but would continue to require minimal disturbance. Hand pulling, digging, and clipping and pulling would not result in any negative alterations to critical habitat and over time would improve conditions for future colonization of *Ivesia webberi* populations.

Biological Controls- Potential effects to PCE's in critical habitat are essentially the same as the potential affects described for occupied habitat. Insect biological controls are not expected to affect plant species associated with *Ivesia webberi* (PCEs). Insect biological controls in and near *Ivesia webberi* habitat would be used to treat primarily musk thistle. Native plant species associated with Webber ivesia are not in the thistle family and would therefore not be vulnerable to potential attack from biological control insects. Targeted grazing could have some impacts to PCE plant species from trampling and grazing. However, these effects would be short term (one growing season) and would be beneficially offset by the reduction of non-native vegetation.

Mechanical mowing and Prescribed Burning- Mechanical methods generally include mowing monocultures of invasive species using Bobcat mowers or larger pieces of equipment. Mechanical methods will not be used in critical habitat for *Ivesia webberi* due to the rocky soil conditions which are not conducive to mechanical treatments**.** While prescribed burning can be an effective tool in treating invasive weeds, due to the relatively barren vegetative communities associated with *Ivesia webberi* and the high potential for invasive weeds to follow fire, prescribed burning would not be proposed as a treatment method in occupied or unoccupied critical habitat for *Ivesia webberi*.

Cumulative Effects: Recreation, including motorized and non-motorized use, has increased significantly in the last 10 in the Peavine and Dog Valley area. This increase has led to the creation of user-created trails, roads, and illegal OHV use which has resulted in inadvertent trampling, disturbance and damage to plants and occupied habitat for *Ivesia webberi*. The presence of vehicles in *Ivesia webberi* habitat can also lead to new infestations of invasive species such medusahead and cheatgrass which have the ability to outcompete and completely replace native plant populations. For example, a population of *Ivesia webberi* that occurs on private property in the Reno area has become inundated with medusahead largely due to several roads that bisect the

population. Wildfire also can contribute to spread of invasive species into rare plant populations. Soils barren of vegetation after a wildfire provide the perfect substrate for invasive species such as cheatgrass and medusahead to take hold. In addition, fire vehicles and equipment can also inadvertently transport weed seed through burned areas increasing the potential for a new infestation. In recent years, the HTNF has taken aggressive action in protecting populations of *Ivesia webberi* through the 2012 Dog Valley Route Adjustment Project (USDA 2012) and the 2006 Peavine Travel Management Plan (USDA 2006) which directed vehicle traffic away from sensitive resource areas. These management efforts, combined with the Raleigh Heights fence project will, over the long term, help to sustain *Ivesia webberi* populations by reducing the impacts from trampling and the threat of type conversion to non-native plant species.

Determination-

Occupied Habitat- Based on the above analysis it is determined that three of the treatment activities associated with the California Integrated Weed Management Project**,** manual, herbicide, and biological controls **may affect and are likely to adversely affect *Ivesia webberi*. This determination is based on:**

- **the potential for individual *Ivesia webberi* plants and surrounding habitat to be negatively impacted during hand pulling and digging activities;**
- **the potential for individual *Ivesia webberi* plants and seeds to be negatively impacted from inadvertent drift of herbicides during herbicide treatments;**
- **the potential for individual *Ivesia webberi* plants to be damaged during biological control treatments including grazing and the release of biocontrol insects.**

The remaining activities associated with the California Integrated Weed Management Project, including ***mowing, mulching, tarping****, and* ***prescribed burning*** will have **no effect** on *Ivesia webberi* because these activities will not occur within occupied habitat for the species.

Potential negative effects described above will be short term and affect only individuals. Overtime, weed treatment activities in occupied habitat for *Ivesia webberi* will benefit the population by reducing and or eliminating competition with non-native plants. The Proposed Action incorporates numerous design features and strategies to assure implementation is conducted with the utmost care and caution in occupied habitat to limit potential negative effects

Designated Critical Habitat-Due to the limited ground disturbing activities proposed in critical habitat, the extensive design features associated with the Proposed Action that will minimize impacts to PCE's, and the long term beneficial effects that will result from controlling and eradicating noxious weeds within critical habitat for *Ivesia webberi*, it is determined that actions associated with the California Integrated Weed Management Project **may affect but are not likely to adversely affect critical habitat for *Ivesia webberi*.**

Table 13: Summary of effects analysis for Threatened, Endangered, and Proposed Species that occur within the CIWMP area

Species	Manual		Mechanical (Mowing)		Herbicides		Bio-Controls		Prescribed burning	
	Occupied Habitat	Critical habitat	Occupied Habitat	Critical habitat	Occupied Habitat	Critical habitat	Occupied Habitat	Critical habitat	Occupied Habitat	Critical habitat
Lahontan Cutthroat Trout	NLTAA	-	NE	-	NLTAA	-	NE	-	NE	-
Paiute Cutthroat Trout	NLTAA	-	NE	-	NLTAA	-	NE	-	NE	-
Sierra Nevada Yellow Legged Frog	LTAA	NLTAA	NE	NE	LTAA	NLTAA	NE	NE	NE	NE
Yosemite Toad	LTAA	NLTAA	NE	NE	LTAA	NLTAA	NE	NE	NE	NE
Sierra Nevada Bighorn Sheep	NLTAA	NLTAA	NE	NE	NLTAA	NLTAA	NE	NE	NE	NE
North American Wolverine	NE	-	NE	-	NE	-	NE	-	NE	-
Ivesia webberi	LTAA	NLTAA	NE	NE	LTAA	NLTAA	LTAA	NLTAA	NE	NE

NE: No Effect; **NLTAA**: Not Likely to Adversely Affect**; LTAA**: Likely to Adversely Affect

IX. LITERATURE CITED

Armour, C.L., D.A. Duff, and W. Elmore. 1994. The Effects of Livestock Grazing on Riparian and Stream Ecosystems. American Fisheries Society Position Statement. January-February.

Aubry KB, McKelvey KS,Copeland JP. 2007. Distribution and Broad-scale Habitat Relations of the Wolverine in the Contiguous United States. Journal of Wildlife Management 71:2147-2158.

Behnke, R.J. and M. Zarn. 1976. Biology and Management of Threatened and Endangered Western Trouts. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado. Technical Report RM-28. 45 pp.

Berg, N.H. 1994. Ice in stream pools in California's central Sierra Nevada: spatial and temporal variability and reduction in trout habitat availability. North American Journal of Fisheries Management. 14:372-384.

Berrill M; Bertram S; McGillivray L; Kolohon M; Pauli B. 1994. Effects of low concentrations of forest-use pesticides on frog embryos and tadpoles. Environmental Toxicology and Chemistry. 13 (4) : 657-664. [Tric03]

Bradford, D. F. 1983. Winterkill, oxygen relations, and energy metabolism of a submerged dormant amphibian, *Rana muscosa*. Ecology 64:1171-1183.

Bradford, D. F. 1984. Temperature modulation in a high-elevation amphibian, *Rana muscosa*. Copeia 1984:966-976.

Bradford, D.F., S.D. Cooper, T.M. Jenkins, Jr., K. Kratz, O. Sarnelle, and A.D. Brown.1998. Influences of natural acidity and introduced fish on faunal assemblages in California alpine lakes. Can. J. of Fish. Aquat. Sci. 55:2478-2491.

Buskirk, S. W., and L.F., Ruggiero,1994. Chapter 2 American Marten; found in Ruggiero, Leonard F.; Aubry, Keith B.; Buskirk, Steven W.; Lyon, L. Jack; Zielinski, William J., tech. eds: The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine in the western United States. Gen. Tech. Rep. RM-254. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station.

Calhoun, A.J. 1943. The biology of the black-spotted trout *(Salmo clarkihenshawi)* (Gill and Jordan) in two Sierra Nevada lakes. Ph.D. dissertation. Stanford University, Palo Alto, California. 218 pp.

CDFW California Department of Fish and Wildlife. 2014. 2013-2014 Annual Report of the Sierra Nevada Bighorn Sheep Recovery Program. Rancho Cordova, CA. 19 pp.

Davidson, C., H. B. Shaffer, And M. R. Jennings. 2002. Spatial tests of the pesticide drift, habitat destruction, UV-B, climate-change hypotheses for California amphibian declines. Conservation Biology 16:1588–1601.

Deinstadt, J.M., D.C. Lentz, E. Gerstung, D.E. Burton, R. Bloom, W.L. Somer, S.K. Lehr, and R. Wickwire. 2004. Survey of fish populations in streams of the East Fork Carson River drainage, California. California Department of Fish and Game. Fisheries Programs Branch: Administrative Report No. 2004-8.

EXTONET Extension Toxicology Network 1994. Pesticide Information Profile for Sulfometuron-methyl. Online at http://pmep.cce.cornell.edu/profiles/extoxnet/pyrethrins-ziram/sulfometuron-methyl-ext.html

Fellers, G. M., and K. L. Freel. 1995. A standardized protocol for sur- veying aquatic amphibians. Technical report NPS/WRUC/NRTR-95- 01. National Biological Service, Cooperative Park Studies Unit, University of California, Davis.

Grinnell, J. and T.I. Storer. 1924. Animal life in Yosemite. Univ. of California Press, Berkeley, California.

Henry CJ; Higgins KF; Buhl KJ. 1994. Acute toxicity and hazard assessment of Rodeo, X-77 Spreader, and Chem-Trol to aquatic invertebrates. Environ. Contam. Toxicol. 27: 392-399.

Hickman, T., and R.F. Raleigh. 1982. Habitat suitability index models: cutthroat trout. FWSIOBS-82110.5. Biological Services Program, U.S. Fish and Wildlife Service. 38 pp.

IWS Institute for Wildlife Populations. 2016. 2006 Winter Wolverine Survey in Sequoia and Kings Canyon National Parks. Found online at: http://www.iws.org/species_wolverine_survey.html

Jennings, M.R. 1996. Status of amphibians *in*: Sierra Nevada Ecosystem. Volume II. Chapter 31. Status of amphibians. Pp 921-944 In: Sierra Nevada Ecosystem Project: Final report to Congress. Centers for Water and Wildland Resources, University of California, Davis.

Johnson, V. 2010. Species account updates for wolverine (*Gulo gulo*) in California. California Wildlife Habitat Relationships System, California Interagency Wildlife Task Group. California Department of Fish and Game. Sacramento, CA.

Kauffman, J.B., and W.C. Krueger. 1984. Livestock Impacts on Riparian Ecosystems and Streamside Management Implications...A Review. Journal of Range Management 37(5):430-437.

Kegley, S.E., Hill, B.R., Orme, S., Choi, A.H., 2009. PAN Pesticide Database. Pesticide Action Network, North America (San Francisco, CA) /http://www.pesticide info.org.

Kucera, T. E., and R. H. Barrett. 1993. The California cooperative wolverine survey: A progress report. Transactions of the Western Section of the Wildlife Society 29:49-53.

La Rivers, I. 1962. Fishes and fisheries of Nevada. Nevada State Fish and Game Commission, Reno, Nevada. 782 pp. 83

Lea, T. N. 1968. Ecology of the Lahontan cutthroat trout, *Salmo clarki henshawi*, in Independence Lake, California. Master's thesis. University of California, Berkeley. 95 pp.

Mallipudi, N. M., S. J. Stout, A. R. daCunha, and A. Lee. 1991. Photolysis of imazapyr (AC

243997) herbicide in aqueous media. J. Agric. Food Chem. 39(2):412-417.

Mangum, F.A. 1984. Aquatic Ecosystem Inventory, Macroinvertebrate Analysis. Annual Progress Report. Toiyabe National Forest.

Martin, K.D., T. Schommer, V.L. Coggins. 1996. Literature review regarding the compatibility between bighorn and domestic sheep. Proceedings of the Biennial Symposium of the Northern Wild Sheep and Goat Council 10:72-77.

Matthews, K. R., and K. L. Pope. 1999. A telemetric study of the movement patterns and habitat use of *Rana muscosa*, the mountain yellow-legged frog, in a high-elevation basin in Kings Canyon National Park, California. Journal of Herpetology 33:615-623.

Matthews, K. R., and C. Miaud. 2007. A skeletochronological study of the age structure, growth, and longevity of the mountain yellow-legged frog, *Rana muscosa*, in the Sierra Nevada, California. Copeia 2007:986-993.

Matthews, K.R.; Preisler, H. 2010. Site fidelity of the declining amphibian *Rana sierrae* (Sierra Nevada yellow-legged frog). Canadian Journal Fisheries & Aquatic Sciences 67 (2): 243-255.

McAfee, W.R. 1966. Lahontan cutthroat trout. Pages 225-231 *in* A. Calhoun, editor. Inland Fisheries management. California Department of Fish and Game, Sacramento, California.

McCall, P. J. and P. D. Gavit. 1986. Aqueous photolysis of triclopyr and its butoxyethyl ester and calculated environmental photodecomposition rates. Environ. Toxic. Chem. 5:879-885.

Moyle, P.B. 1976. Inland Fishes of California. University of California Press, Berkeley, California. 405 pp.

Moyle, P.B. 2002. Inland Fishes of California. University of California Press. Revised and Expanded .Berkeley, California.

Mullally, D. P., and J. D. Cunningham. 1956. Ecological relations of *Rana muscosa* at high elevations in the Sierra Nevada. Herpetologica 12:189-198.

Mullally, D.P.; Powell, D.H. 1958. The Yosemite toad: northern range extension and possible hybridization with the western toad. Herpetologica. 14: 31-33.

Neary, D.G., K.C. Ryan, L.F. DeBano, eds. (2005) (revised 2008). Wildland fire in ecosystems: effects of fire on soils and water. Gen. Tech. Rep. RMRS-GTR-42-vol.4. Ogden, UT. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
250 pp.

Neskovic NK; Poleksic V; Elezovic I; Karan V; Budimir M. 1996. Biochemical and histopathological effects of glyphosate on carp, *Cyprinus carpio* L. Bull. Environ. Contam. Toxicol. 56(2): 295-302.

Newton, M., F. Roberts, A. Allen, B. Kelpsas, D. White, and P. Boyd. 1990. Deposition and dissipation of three herbicides in foliage, litter, and soil of brushfields of southwest Oregon. J. Agric. Food Chem, 38:574-583.

Norris, L., M. L. Montgomery, and L. E. Warren. 1987. Triclopyr persistence in western Oregon hill pastures. Bull. Environ. Contam. Toxic. 39:134-141.

Perkins MJ. 2000. Effects of Two Formulations of Glyphosate and Triclopyr on Four Non-target Aquatic Species: Xenopus laevis, Myriophyllum sibiricum, Lemna gibba and Tubifex tubifex. MS Thesis, Univ of Guelph, Canada. 110 p. [SET01c].

Pope, K.L. 1999. Mountain yellow-legged frog habitat use and movement patterns in a high elevation basin in Kings Canyon National Park. San Luis Obispo, CA: California State Polytechnic University. 64 p. M.S. thesis.

Pope, K. L., and K. R. Matthews. 2001. Movement ecology and seasonal distribution of mountain yellow-legged frogs, *Rana muscosa*, in a high-elevation Sierra Nevada basin. Copeia 101:787–793.

Quaranta A; Bellantuono V; Cassano G: Lippe C. 2009. Why Amphibians Are More Sensitive than Mammals to Xenobiotics. PLoS ONE. 4: (11): 1-4.

Rachowicz, L. J., R. A. Knapp, J. A. T. Morgan, M. J. Stice, V. T. Vredenburg, J. M. Parker, and C. J. Briggs. 2006. Emerging infectious disease as a proximate cause of amphibian mass mortality. Ecology 87:1671-1683.

Relyea RA; Jones DK. 2009. The Toxicity of Roundup Original Max to 13 Species of Larval Amphibians. Environ Toxicol Chem. 28(9):2004-8. [Set03].

Runcie, J.2012. Wildlife Biologist working under the supervision of Dr. Tom Stephenson, Sierra Nevada Bighorn Sheep Recovery Program Leader. Email correspondence regarding the current distribution of Sierra Nevada bighorn sheep. Email dated January 20, 2012.

Ryan, J.H. and S.J. Nicola. 1976. Status of the Paiute cutthroat trout, *Salmo clarki seleniris* Snyder, in California. Department of Fish and Game. Inland Fisheries Administrative Report No. 76-3. August 1976.

Schempf , P.F., and M. White. 1977. Status of six furbearer populations in the mountains of Northern California. USDA, Forest Service, San Francisco, CA 51 pp.

Stephenson, G. R., K. R. Solomon, C. S. Bowhey, and K. Liber. 1990. Persistence, leachability, and lateral movement of triclopyr (Garlon) in selected Canadian forestry soils. J.Agric.Food Chem. 38:584-588

Syracuse Environmental Research Associates (SERA). 1997. Use and assessment of marker dyes used with herbicides. December 21, 1997. SERA TR 96-21-07-03b. Fayetteville, New York. 30 pp.

Syracuse Environmental Research Associates (SERA). 2004a. Chlorsulfuron: Human Health and Ecological Risk Assessment - Final Report. November 21, 2004. SERA TR-04-43-18-01c. Fayetteville, New York. 180 pp.

Syracuse Environmental Research Associates (SERA). 2004b. Sulfometuron-methyl: Human Health and Ecological Risk Assessment – Final Report. December 14, 2004. SERA TR-03-43-17-02c. Fayetteville, New York. 163 pp.

Syracuse Environmental Research Associates (SERA). 2007. Aminopyralid: Human Health and Ecological Risk Assessment - Final Report. June 28, 2007. SERA TR-052-04-04a. Fayetteville, New York. 153 pp.

Syracuse Environmental Research Associates (SERA). 2009. Technical Comparison of EPA, BLM and Forest Service Pesticide Risk Assessments - Final Report. July 29, 2009. SERA TR-052-19-02. Fayetteville, New York. 39 pp.

Syracuse Environmental Research Associates (SERA). 2011a. Glyphosate: Human Health and Ecological Risk Assessment - Final Report. March 11, 2011. SERA TR-052-22-03b. Manlius, New York. 313 pp.

Syracuse Environmental Research Associates (SERA). 2011b. Imazapyr: Human Health and Ecological Risk Assessment – Final Report. December 16, 2011. SERA TR-052-29-03a. Manlius, New York. 215 pp.

Syracuse Environmental Research Associates (SERA). 2011c. Triclopyr: Human Health and Ecological Risk Assessment – Final Report. March 24, 2011. SERA TR-052-25-03a. Manlius, New York. 267 pp.

Stebbins, R.C. 1985. A Field Guide to Western Reptiles and Amphibians. Second Edition, revised. Houghton Mifflin Company, Boston, Mass.

Stebbins, R. C. 2003. A field guide to western reptiles and amphibians. Third edition. Houghton Mifflin Company, Boston, Massachusetts.

Suckling, David Maxwell, and René François Henri Sforza. 2014."What Magnitude Are Observed Non-Target Impacts from Weed Biocontrol?" Ed. Frederic Marion-Poll. PLoS ONE 9.1: e84847.

Swales, S., R.B. Lauzier and C.D. Levings. 1986. Winter habitat preferences of juvenile salmonids in two interior rivers in British Columbia. Canadian Journal of Zoology 64:1506-1514.

Trumbo R. 2005. An Assessment of the Hazard of a Mixture of the Herbicide Rodeo and the Non-Ionic Surfactant R-11 to Aquatic Invertebrates and Larval Amphibians. California Fish and Game. 91(1): 38-46.

USDA Forest Service. 1986. The Toiyabe National Forest Land and Resource Management Plan. United States Forest Service, Toiyabe National Forest.

USDA Forest Service. 1992. Forest Service Handbook (FSH) Intermountain Region, 2209.13, Chapter 10, Section 16.5, Changes in Grazing Permits.

USDA Forest Service. 1999. Eastern Sierra Nevada Riparian Field Guide. Weixelman, D., Zamudio, D., Zamudio, K.. USDA Forest Service, Intermountain Region, R4-ECOL-99-01. Sparks, Nevada.

USDA Forest Service. 2001 Sierra Nevada Forest Plan Amendment, Final Environmental Impact Statement Chapter 3 Part 4, Volume 3 of 6. 4.3.1.1. Sierra Nevada Bighorn Sheep (*Ovis canadensis californiana*) Part 4.3 p. 1-6.

USDA Forest Service. 2001 & 2004. Sierra Nevada Forest Plan Amendment. Record of Decision.

USDA Forest Service. 2006. Environmental Assessment for the Peavine Mountain Travel Management Plan. Carson Ranger District, Humboldt-Toiyabe National Forest, Carson City, Nevada. 34 pp.

USDA Forest Service. 2007. Bakke, D. Ed. Analysis of Issues Surrounding the Use of Spray Adjuvants with Herbicides. Region 5, Pacific Southwest Region, USDA Forest Service. January 2007

USDA Forest Service. 2008. News: Preliminary DNA analysis completed on wolverine. On-line at website: http://www.dfg.ca.gov/news/issues/wolverine/20080402-USFS-NR.pdf

USDA Forest Service. 2009. Conservation Assessment and Strategy for *Ivesia webberi* (*Ivesia webberi*) for the Carson Ranger District, Humboldt-Toiyabe National Forest (*Prepared by* Elizabeth Bergstom, Botanist, Humboldt-Toiyabe N.F.).

USDA Forest Service. 2012.Environmental Assessment for the Dog Valley Route Adjustment Project, Carson Ranger District, Humboldt-Toiyabe National Forest, Carson City NV.

USDA Forest Service. 2016. Greater Sage-grouse Bi-state Distinct Population Segment Forest Plan Amendment Record of Decision. Humboldt-Toiyabe National Forest. 61 pp.

USDI Fish and Wildlife Service. 1967. Native fish and wildlife: Endangered species. Federal Register 32:4001. March 11, 1967.

USDI Fish and Wildlife Service. 1973. Endangered Species Act, 16 U.S.C. 1531-1544. Fish and Wildlife Service.

USDI Fish and Wildlife Service. 1975. Threatened status for three species of trout. Federal Register 40:29863-29864. July 16, 1975.

USDI Fish and Wildlife Service. 1995. Lahontan cutthroat trout, *Oncorhynchus clarki henshawi*, recovery plan. U.S. Fish and Wildlife Service, Portland, Oregon. 147 pp.

USDI Fish and Wildlife Service. 1998. Endangered Species Consultation Handbook. Procedures for Conducting Consultation and Conference Activities under Section 7 of the Endangered Species Act. U.S. Fish and Wildlife Service and National Marine Fisheries Service. March 1998.

USDI Fish and Wildlife Service. 2000. Endangered and Threatened Wildlife and Plants; Final Rule to List the Sierra Nevada Distinct Population Segment of the California Bighorn

Sheep as Endangered. Final Rule. Federal Register Vol. 65. No. 1 50 CFR Part 17.

USDI Fish and Wildlife Service. 2002. 12-Month Finding for a Petition to List the Yosemite Toad. Federal Register Vol. 67, No. 237. Tuesday, December 10, 2002.

USDI Fish and Wildlife Service. 2004. Revised Recovery Plan for the Paiute cutthroat trout (*Oncorhynchus clarki seleniris*). Portland, Oregon. ix + 105 pp.

USDI Fish and Wildlife Service. 2007. Final Recovery Plan for the Sierra Nevada Bighorn Sheep. California/Nevada Operations Office U.S. Fish and Wildlife Service, Sacramento, California.

USDI, Fish and Wildlife Service. 2008. Endangered and Threatened Wildlife and Plants; Designation of Critical habitat for the Sierra Nevada Bighorn Sheep (*Ovis canadensis californiana*) and Taxonomic Revision; Final Rule. August 5, 2008.

USDI Fish and Wildlife Service. 2011. Candidate Notice of Review. Federal Register 76:66370-66439.

USDI Fish and Wildlife Service. 2014(a). Endangered and Threatened Wildlife and Plants; Endangered Species Status for Sierra Nevada Yellow-Legged Frog and Northern Distinct

Population Segment of the Mountain Yellow-Legged Frog, and Threatened Species Status for Yosemite Toad; Final Rule. Federal Register Vo. 72 No. 89; 50 CFR Part 17.

USDI Fish and Wildlife Service. 2014(b). Endangered and Threatened Wildlife and Plants; Threatened Species Status for *Ivesia webberi*; Final Rule. Federal Register Vo. 79 No. 106; 50 CFR Part 17.

USDI Fish and Wildlife Service. 2014(c). Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for *Ivesia webberi*; Final Rule. Federal Register Vo. 79 No. 106; 50 CFR Part 17.

USDI Fish and Wildlife Service. 2014(d). Species Report for *Ivesia webberi* (Webber's ivesia). Nevada Fish and Wildlife Office. January 8, 2014. 48 pp.

USDI Bureau of Land Management 2014(e). Rimsulfuron Environmental Risk Assessment.

USDI Fish and Wildlife Service. 2016(a). Endangered and Threatened Wildlife and Plants; Designation of Critical habitat for the Sierra Nevada Yellow-Legged Frog, the Northern DPS of the Mountain Yellow-Legged Frog, and the Yosemite Toad. Final Rule. Federal Register Vol. 81, No. 166.

USDI Fish and Wildlife Service. 2016(b). Court-Ruling Reopens Comment-Period on North-American Wolverine Proposed Listing Rule. Found at: https://www.fws.gov/mountain-prairie/pressrel/2016/10172016_Court-Ruling-Reopens-Comment-Period-on-North-American-Wolverine-Proposed-Listing-Rule.php.

U.S. EPA United States Environmental Protection agency. 2005(a). Prevention, Pesticides, and Toxic Substances. R.E.D. Fact Sheet: Aminopyralid.

U.S. EPA United States Environmental Protection agency. 2005(b). Prevention, Pesticides, and Toxic Substances. R.E.D. Fact Sheet: Chlorsulfuron.

U.S. EPA United States Environmental Protection agency. 2012. Prevention, Pesticides, and Toxic Substances. R.E.D. Fact Sheet: Glyphosate.

Vredenburg VT (2004) Reversing introduced species effects: Experimental removal of introduced fish leads to rapid recovery of a declining frog. Proc Natl Acad Sci USA 101:7646–7650.

Vredenburg, V. T., G. M. Fellers, and C. Davidson. 2005. The mountain yellow-legged frog (*Rana muscosa*). Pages 563-566 *in* M. J. Lanoo, editor. Status and Conservation of U.S. Amphibians. University of California Press, Berkeley, California.

Wehausen, J. D. 1996. Effects of mountain lion predation on bighorn sheep in the Sierra Nevada and Granite Mountains of California. Wildlife Society Bulletin 24:471-479.

Witham 1991. Final Report, Focused Field Survey, *Ivesia webberi*, *Ivesia webberi* prepared for the Toiyabe National Forest. On – file at the Humboldt – Toiyabe N.F. Supervisor's Office. Sparks, NV. 17pgs.

Witham, C.W. 2000. Current knowledge and conversation status of *Ivesia webberi* (Rosaceae), the *Ivesia webberi*, in Nevada Carson City: Nevada Natural Heritage Program, status report prepared for the U.S. Fish and Wildlife Service, Reno, Nevada.

Zweifel, R. G. 1955. Ecology, distribution, and systematics of frogs of the *Rana boylei* group. University of California Publications in Zoology 54:207-292.

Appendix A. Applications Rate and Concentrations Compared to Known LC50s for Fish and Amphibians.

Common and Product Name	Planned Application rate (Gal./Acre)	Active Ingredient (Lbs./Acre)	Active Ingredient (mg/Acre)	L/Acre	Concentration (mg/ml)	Concentration (mg/L)	Fish LC50 (mg/L)	Amphibians LC50 (mg/L)
***Aminopyralid* (Milestone)**	20.0000	0.7500	340.5000	75.7000	0.0045	0.00000449	100 (rainbow trout)	95 (northern leopard frog)
***Aminopyralid* (Milestone)**	20.0000	0.3750	170.2500	75.7000	0.0022	0.00000224	100 (rainbow trout)	95 (northern leopard frog)
***Clopyralid (Transline)* low**	20.0000	0.0900	40.8600	75.7000	0.0005	0.00000053	104 (rainbow trout)	N/A
***Clopyralid* (Transline)high**	20.0000	0.5000	227.0000	75.7000	0.0030	0.00000299	104 (rainbow trout)	N/A
***Chlorsulfuron* (Telar)**	20.0000	1.0000	454.0000	75.7000	0.0060	0.00000599	39 (brown trout)	N/A
***Chlorsulfuron* (Telar XP)**	20.0000	1.0000	454.0000	75.7000	0.0060	0.00000599	39 (brown trout)	N/A
***Glyphosate* (Rodeo, Acord, Aquamaster)**	20.0000	1.0000	454.0000	75.7000	0.0060	0.00000599	5 (rainbow trout)* 13 (rainbow trout)	6.5 (northern leopard frog)
***Imazapyr* (Habitat) low**	20.0000	0.2500	113.5000	75.7000	0.0015	0.00000149	>100 (rainbow trout)	N/A
***Imazapyr* (Habitat) high**	20.0000	0.7500	340.5000	75.7000	0.0045	0.00000449	>100 (rainbow trout)	N/A
***Triclopyr* (Garlon 3A)**			0.0000	0.0000	#DIV/0!	#DIV/0!	552 (rainbow trout)	1.1 (tadpole bullfrog)^ 2.3-4.6 (tadpole bullfrog)
***Sulfometuron-methyl* (Oust)**	20.0000	0.2500	113.5000	75.7000	0.0015	0.00000149	12.5 (rainbow trout)	.38 (Xenopus)* 7.5 (Xenopus)
							* malformations ^unresponsive to prodding	

Appendix B. PROJECT DESIGN FEATURES

The issue statements below are based on preliminary review and analysis from the ID team and provide information on potential resource issues related to the proposed action. From these issue statements, design features were developed and incorporated into the proposed action to avoid or minimize potential impacts from project activities. Design features are applied in conjunction with pertinent management direction and guidelines.

Soils/Watershed

Issue: The use of herbicide treatments may negatively affect soil conditions and or increase the risk of contaminating watersheds through drift and ground water seepage.

16. Under the Proposed Action, the Carson and Bridgeport Ranger Districts will follow the Lahontan Regional Water Quality Control Board Notification Protocol as amended (LRWQB 2012) that was designed for weed treatments on the Lake Tahoe Basin Management Unit. The protocol will be included as an appendix to the EA; key components of the protocol are summarized below:

    - **Category I—No notification/consultation to Water Board staff is required prior to treatment if below criteria are met.**
        - **Size and Cover Class Criteria for Category I:** Infestations that are less than ¼ acre in size and less than 25% total weed cover. The majority of infestations in the CIWMP area fall within this category.

    - **Category II—48-hour turnaround from Water Board staff for emergency situations**
        - **Size and Cover Class Criteria for Category II:** Infestations that are up to 1 acre in size and any cover class (excluding Category I, <1/4 acre and < 25% cover, which requires no Water Board notification).

    - **Category III- Full consultation with Water Board staff required prior to treatment.**
        - **Size and Cover Class Criteria for Category III:** Any infestation greater than 1 acre, any infestation within 25 feet of a surface water; or non-emergency infestations (not Category II) from ¼ to 1 acre in area.

17. Mixing or application of herbicides will not occur within 100 feet of a well or spring used as a domestic water source. Certified applicators will be briefed about the locations of water sources prior to beginning work and buffers will be flagged on the ground.

18. Where possible, manual weed treatment methods would be utilized within 50 feet of perennial rivers, streams, lake, wet meadows, and other water bodies, including seasonally flooded areas. If herbicides are determined to be necessary for treatment within 50 feet of a perennial waterway, only herbicides and surfactants that are registered with the California Department of Pesticide Regulation for aquatic use will be used.

19. Herbicide application methods used between 50 and 10 feet of a perennial waterway may include spot spraying, dip and clip and or wicking and wiping methods. Within 10 feet of a perennial waterway, if herbicides are determined to be the appropriate treatment method, only dip and clip and/or wicking and wiping methods will be used.

20. Preparation of herbicides for application, including mixing, filling of wands and rinsing of spray equipment, will take place outside of Riparian Conservation Areas and more than 300 feet from surface water.

21. Herbicide preparation will occur only on level, disturbed sites off of roadways, such as the interior of landings. Water drafting from aquatic features will not occur.

22. Streams or other surface waters must not be used for washing herbicide application equipment or personnel, unless required in an emergency situation. However, Pesticide Worker Safety Regulations require that water, soap and a towel be available within ¼ mile of field workers and at mixing sites.

23. Manual treatment will be utilized in lieu of chemical treatment when effective.

24. Herbicides will be used in accordance with label instructions. Project Design features may describe more restrictive measures for use and application. Herbicide applications will treat only the minimum area necessary to meet project objectives.

25. Prior to the start of application, all spray equipment would be calibrated to insure accuracy of delivered amounts of pesticide. Application equipment used will be regularly inspected during pesticide application to insure it is in proper working order.

26. Herbicides will be applied by trained and/or certified applicators in accordance with label instructions and applicable federal and state pesticide laws. Label instructions include precautions on application under certain wind, temperature, precipitation and other weather conditions to reduce drift, volatilization, leaching, or runoff.

27. Herbicide spray applications will not occur when wind velocity is eight miles per hour or greater. A weather kit will be carried by applicators and weather conditions would be monitored periodically by trained personnel during herbicide applications. Prior to beginning work, applicators will be provided with information on local terrain and wind patterns and how they affect spray drift.

28. Weather conditions (wind speed and direction, precipitation, precipitation probability, temperature, temperature inversions, atmospheric stability, and humidity) will be carefully monitored before and during herbicide applications to minimize drift, volatilization, and leaching or surface runoff of herbicides, based on label precautions.

29. Herbicide applications will not be conducted during rain nor immediately following rain when soil is saturated or runoff, standing water, or a heavy due is present. Application will occur only under favorable weather conditions, defined as:

- 30% or less chance of precipitation on the day of application based upon NOAA weather forecasting If rain, showers or light rains are predicted within 48 hours, the amount of rain predicted shall be no more than ¼ inch of rain, and rain does not appear likely at the time of application

30. A spill cleanup kit will be readily available whenever herbicides are transported or stored. A spill kit would be carried by the applicator at all times when using wicking application method.

Wildlife (Aquatic and Terrestrial)

Issue: Activities associated with treating noxious weeds may potentially affect aquatic and terrestrial wildlife species such as the Sierra Nevada yellow-legged frog, Yosemite toad, Lahontan and Paiute cutthroat trout, and Sierra Nevada bighorn sheep. Herbicides could affect these species directly and indirectly if over-concentrations of herbicide are applied or applied incorrectly. Other noxious weed treatments may also indirectly affect aquatic and terrestrial wildlife due to disturbance occurring during the breeding season, particularly if treatments include ground disturbing activities such as mowing and prescribed burning.

Aquatic Wildlife

31. During the Annual Implementation Process, the Forest Fisheries Biologist will review new treatment sites identified under EDRR that are within 500 feet of Sierra Nevada yellow-legged frog or Yosemite toad occurrences or within their designated critical habitats. Treatment strategies in these areas, including applying buffers, limited operating periods, and relocating individual amphibians, will be developed collaboratively an annual basis by the noxious weed coordinator and the Forest Fisheries Biologist to assure treatment efforts minimize impacts to frog and toad populations and critical habitat. The Forest Fisheries Biologist will also review new treatment sites that are with 300 ft of occupied Lahontan cutthroat trout or Paiute cutthroat trout streams to ensure treatment efforts follow design features outlined below.

32. Weed treatments within occupied, critical habitat, and potential breeding areas in suitable habitat for Sierra Nevada yellow-legged frog and Yosemite toad will consist only of manual methods (hand pulling, digging, clipping and bagging) or direct application of herbicide (dip and clip, wick and wipe). Other manual methods, including tarping and mulching, will not be used within Sierra Nevada yellow-legged frog or Yosemite toad occupied or critical habitat. While these methods can be effective in controlling noxious weeds, they are not feasible to implement and maintain in the remote settings where Sierra Nevada yellow-legged frogs and Yosemite toads are located.

33. Immediately prior to any treatment activities in occupied habitat, a Forest Service biologist who is trained in identifying and handling rare amphibians, will survey the area for Sierra Nevada yellow-legged frogs and/or Yosemite toads. If individuals are found they will be relocated to a safe location that is nearby but out of potential harm's way from treatment activities. In most cases this will be less than 100 feet from the original location of the amphibian.

34. In occupied habitat, weed treatments will not be conducted within 50 feet of known breeding locations for Sierra Nevada yellow-legged frog and Yosemite toad until after metamorphosis has occurred. Metamorphosis typically occurs around July 31st and will be confirmed with a follow-up survey.

35. To minimize disturbance to Sierra Nevada yellow-legged frogs and Yosemite toads, treatments in occupied areas for these species may only occur on a maximum of ½ acre per year not to exceed 1/10 of an acre in any given location.

36. Within potential breeding areas considered suitable habitat for Sierra Nevada yellow-legged frogs (lakes and streams) or Yosemite toad (ponds and surrounding meadows), a maximum of ½ acre will be treated per year not to exceed 1/10 of an acre in any given location. If surveys determine the suitable habitat is not occupied, treatment acre limits would not apply.

37. When in proximity to Lahontan and Paiute cutthroat trout habitat, every effort will be made to treat weeds by manual methods. If it is determined the use of herbicides is the only practical method to treat weed infestations in these areas, only dip & clip and/or wicking & wiping applications of aquatic formulations of glyphosate or imazapyr will be used within 50 feet from occupied Lahontan and Paiute cutthroat trout habitat.

38. Tarping and mulching will not be used within occupied Lahontan and Paiute cutthroat trout habitat. While these methods can be effective in controlling noxious weeds, they are not feasible to implement and maintain in remote riparian settings.

39. Mechanical, biological control and prescribed burn treatments will not occur within PCT occupied habitat due to the minimal weed infestations associated with PCT habitat and the logistical challenges associated with using these treatment methods in the wilderness (where PCT occur).

40. Prescribed burning will not occur within 300 feet of occupied habitat for LCT to eliminate the potential for inadvertent disturbance from burning operations to LCT and LCT habitat.

41. To minimize negative impacts to Lahontan cutthroat trout (LCT), mechanical methods (mowing) and targeted grazing will not be permitted within 50 feet of an occupied LCT stream channel. This buffer will minimize the potential for any mowed clippings to enter the waterway and eliminate the potential for bank disturbance and erosion from mowing and/or targeted grazing.

Terrestrial Wildlife

42. During the Annual Implementation Process, the noxious weed coordinator will coordinate with the District and/or Forest wildlife biologist before each treatment season, to verify that treatments would not disturb breeding activity of any special status terrestrial wildlife species. Limited operating periods for all special status wildlife species will be implemented as necessary, based on the most current wildlife data from pre-project field surveys, or habitat suitability as determined by the district biologist.

43. To minimize disturbance to Sierra Nevada bighorn sheep, weed treatments will not be conducted in any occupied habitat during the lambing period which typically occurs between April and mid-July (USDI 2000).
44. To minimize the potential for conflict between domestic livestock and Sierra Nevada bighorn sheep, the use of domestic sheep and goats as biological controls will not be used on any occupied or designated Critical habitat for Sierra Nevada bighorn sheep. The use of insect biological controls will also not be used in occupied and/or critical habitat for Sierra Nevada bighorn sheep.
45. To minimize potential disturbance to Sierra Nevada bighorn sheep and their habitat, the use of mechanical treatments (mowing, trimming) and prescribed burning to treat noxious weeds will not be used in Sierra Nevada bighorn sheep occupied and/or critical habitat.
46. Within Sierra Nevada bighorn sheep occupied and critical habitat, every effort will be made to treat weeds by hand pulling and or clipping and bagging. If herbicides are determined to be necessary to treat a weed population, they will be applied using hand methods such dip and clip or wick and wipe to avoid potential negative effects to sensitive sub-alpine native plant communities which are important to Sierra Nevada bighorn sheep.
47. Other manual methods, including tarping and mulching, will not be used within Sierra Nevada bighorn sheep occupied or critical habitat. While these methods can be effective in controlling noxious weeds, they are not feasible to implement and maintain in the remote settings where Sierra Nevada bighorn sheep are located.
48. Any treatments proposed in occupied or potential habitat for the Bi-State Distinct Population Segment of sage grouse and/or the Greater sage grouse will be reviewed with the District wildlife biologist during the Annual Implementation Process.
49. Per Standards and Guidelines in the Greater Sage-grouse Bi-state Distinct Population Segment Forest Plan Amendment (USDA 2016, Standard S-02), herbicide weed treatments will only occur outside of the critical disturbance period for Bi-State sage grouse (March 1 – May 15 (+/ – 2 weeks depending on conditions). Herbicides should only be used in Bi-State sage grouse habitat if other integrated pest management approaches are inadequate or infeasible. All additional pertinent 2016 Toiyabe Forest Plan Amendment standards and guidelines related to Bi-State sage grouse will also be reviewed and followed during treatment planning and implementation.

Rare Plants

Issue: Noxious weed treatments could potentially affect non-target native plant communities including rare plant populations. The use of herbicides and potentially other treatment activities could impact individual plants as well as populations. Modification of the plant community structure and composition could impact sensitive plants and their habitats.

50. During the Annual Implementation Process, all noxious weed treatments proposed within 500 feet of *Ivesia webberi* populations and designated critical habitat would be reviewed by the District and/or Forest Botanist to verify that treatment strategies are consistent with management direction for this species.

51. When herbicide use is determined to be the most appropriate treatment method for broad leaved non-native plants (such as musk thistle) in occupied habitat for *Ivesia webberi*, the dip and clip or wick and wipe method will be used to minimize potential for unintentional drift.
52. To minimize impacts to individual plants, herbicide treatment of non-native grasses within occupied and critical habitat for *Ivesia webberi* will occur in the fall when *Ivesia webberi* is dormant and plant foliage is no longer present.
53. To limit the potential for herbicide spills within *Ivesia webberi* habitat, no mixing and loading of herbicides would occur within occupied or critical habitat for *Ivesia webberi*.
54. All herbicide treatments in occupied and/or critical habitat will occur with hand held backpacks, spray wands, and other direct application equipment. Crew sizes will be limited to two people while conducting treatments. No vehicles such as spray trucks or UTVs will be used within *Ivesia webberi* habitat.
55. While in *Ivesia webberi* habitat, a small containment kit would be carried by herbicide applicators to further limit potential effects in the event of equipment failure (i.e. backpack leaking).
56. Mechanical treatments and prescribed burning will not be conducted within occupied habitat for *Ivesia webberi* to minimize the potential for inadvertent negative effects.
57. To minimize inadvertent damage to individual *Ivesia webberi* plants during digging and hand pulling treatments, weeds that cannot safely be pulled without damaging an Ivesia plant, would be treated by cutting and bagging the flower heads and potentially using dip and clip or wick and wipe herbicide application methods to treat the additional stem.
58. Other manual techniques, including mulching and tarping, would not be used in occupied habitat for *Ivesia webberi* to avoid negative impacts to the species.
59. Prior to conducting weed treatments in unoccupied critical habitat for *Ivesia webberi*, surveys will be conducted within 500 feet of new weed infestations identified for chemical and biological treatment, and within 25 feet of new infestations identified for manual treatment. If *Ivesia webberi* plants are found, design features 50-58 and #61 will be implemented during treatment activities.
60. Where determined necessary based on habitat potential, surveys will also be conducted for Forest Sensitive species and HTNF Watch List plant occurrences within 500 feet of new infestations identified for chemical and biological treatment, and within 25 feet of new infestations identified for manual treatments prior to implementation.
61. Where treatments occur within 500 feet of TEPCS or HTNF Watch List plant occurrences, weed crews would be instructed in the proper identification of plant species to be avoided to ensure that individual TEPCS or HTNF Watch List plants are protected. The Forest Service District or Forest Botanist will accompany weed crews when treatments are conducted in occupied habitat for *Ivesia webberi*.